Page 6
Atari Users Magazine

Issue 22
£1

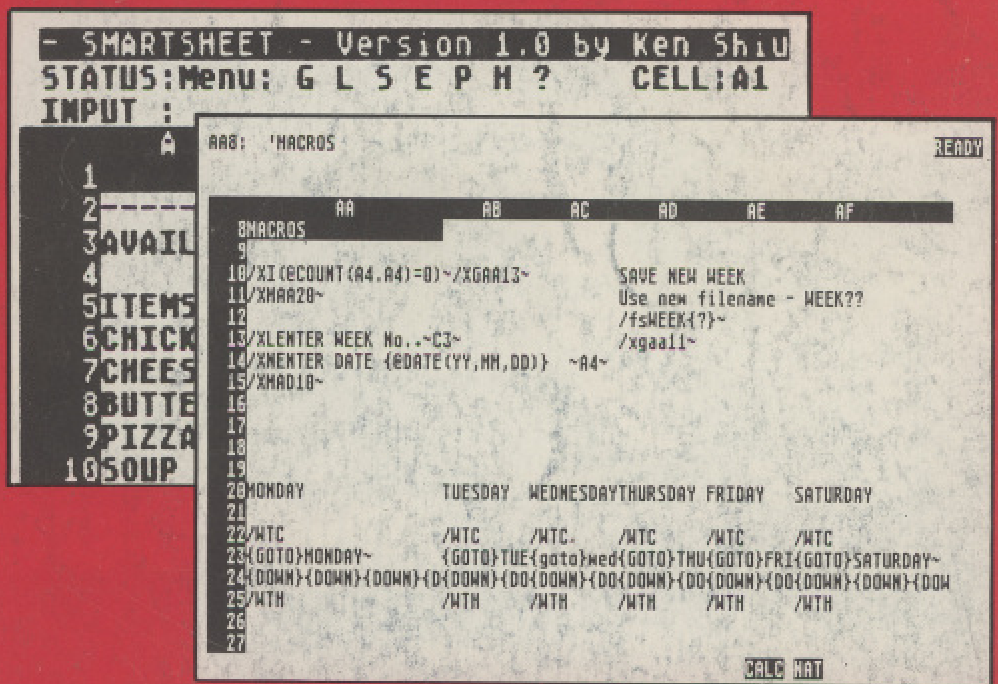
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PAGE 6 Atari Users Magazine

July/August 1986

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P.O.Box 54
Stafford
ST16 1DR

Editorial and Advertising
0785 213928

Printed by
Stafford Reprographics Ltd.
0785 3533

Typeset by
Budget Typesetting Ltd.
0634 41878

PAGE 6 is published bi-monthly

PAGE 6 is a user's magazine and relies entirely on readers' support in submitting articles and programs. The aim is to explore ATARI computing through the exchange of information and knowledge. We will endeavour to pay for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers' Poll and may receive additional Editorial awards as announced from time to time in the magazine.

LISTINGS

FEATURES

REVIEWS

ST SECTION

Subscription rates annual (6 issues)

U.K.	£ 7.00
Europe	£10.50
Elsewhere - Surface	£10.50
Elsewhere - Air Mail	£16.00

Single copies and back issues at one-sixth of the annual rates

Disk Subscriptions:

U.K.	£30.00
Europe	£37.50
Elsewhere	Please enquire

Please make cheques payable to PAGE 6.

Copy date for the next issue is 21st July. Publication date is 1st September 1986.

Editorial

HOLDING ITS OWN

Are you an 8-bit user feeling a little dispirited by all the publicity that the ST is getting? Well, let me give you a few words of comfort.

It is true that the ST can do many powerful things that are outside the scope of any 8-bit machine but there are also many applications where the good old Atari can hold its own. Take word processing. I fully intended to transfer the make up of PAGE 6 to the ST but at present, out of the dozen or so word processors avaialable, there are none that are a significant improvement over Superscript or PaperClip to warrant changing. Indeed the majority of those available are significantly inferior and the remainder all seem to have their own peculiar formats making each incompatible with anything else. So, for the foreseeable future PAGE 6 will continue to be produced on a 130XE using Superscript (I am too used to it to change, despite my comments on PaperClip) and any 8-bit owners can continue to feel proud that they have a machine that can still hold its own in many circumstances.

An editorial in another magazine recently bemoaned the fact that although tens of thousands of ST's have been sold finding those owners and gathering all-round concerted support of the machine was, strangely, very difficult. Don't tell us, we have lived with this problem for three years! The fact is, as all readers will know, that Atari has never had widespread popular support from the trade in this country and possibly never will. In hundreds of towns and cities up and down the country you can walk into a computer shop and find software for half a dozen machines (even extinct ones) and nothing for Atari. That's a fact of life, and despite the eternal optimistic comments from Atari, it is a situation that is not likely to change dramatically because without widespread outlets software companies will not produce the software and without the software there will be no widespsread outlets. What happens is that you get (hundreds of) thousands of Atari owners who do little with their machines and seldom make contact with others.

That is the situation so what can be done? Well Atari themselves are the only people capable of redressing the situation and they could do it quite simply. One problem with the way Atari operate is that by farming out warranty repairs to retailers and distributors they do not have any sort of record of who buys the machines and consequently, unlike with other manufacturers, they have a huge user base which they cannot identify. Fair enough if they want others to do repairs but if they simply put a card in each box inviting purchasers to complete and return it to receive information about their machine in the future, they could build up a mailing list of virtually all the users of their machines. This mailing list could then be rented out to interested parties who provide support for Atari machines (can I be first in the queue please!) and the whole Atari market could revceive a much needed boost. Software producers would be able to reach a much wider market, magazines would be able to obtain more readers and retailers would be encouraged to stock Atari titles as more became available. Pipe dreams? I don't think so. And what's more, by renting out the mailing list, Atari could maintain records of all their customers without it costing them a penny.

THE ARIOLASOFT SPOT!

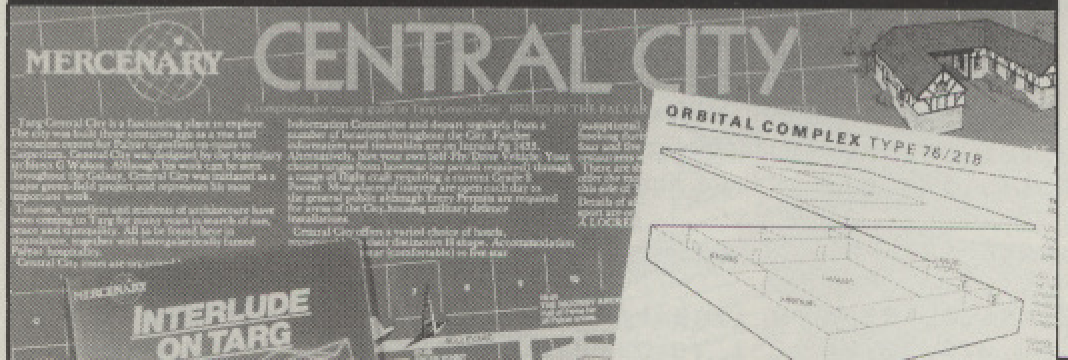
You might be forgiven for feeling that we have some connection with Ariolasoft for every issue seems to mention them. The fact is that they are one of the few companies to have a regular schedule of releases for Atari and to let people know what they are doing. Good for them, they will continue to get our support and deserve yours.

This issue brings news of a cassette version of Archon II priced at £9.95. Archon has already been reviewed by PAGE 6 and Archon II is reported to be better although we have not yet seen it.

On disk priced at £14.95 is Racing Destruction Set, a computerised 1 or 2 player slot-car racing game. The game features a split screen with 50 of the world's top racing circuits and a choice of ten different vehicles, 14 gravity settings(?) and four backgrounds. Circuits and vehicles can be customised and you can drive Grand Prix, motocross, roadrace, dirt track and more. Lots more options, sounds like great fun!

Continuing with their excellent 'Home Productivity' range May saw the release of B/Graph on two disks at £29.95. Aside from being the only serious graphing package available for the Atari, B/Graph received rave reviews when it was first released by Batteries Included a couple of years ago. Anyone interested in putting their Atari to serious use should look out for this. Pie graphs, bar charts, line and area graphs each with up to three factors and 100 data points and a lot more besides.

News News



BACK TO TARG?

For all those hooked on Mercenary, Novagen are offering a unique enhancement to the game in the form of the Targ Survival Kit, a unique package of a poster, fact sheets, a booklet and Mercenary badge. Very nicely produced and costing just £3.95 mail order direct from Novagen.

Due for imminent release is a second data set for Mercenary entitled THE SECOND CITY. Using the load game feature of the original game a whole new scenario is presented which the authors claim will provide a really tough challenge for all those who have escaped from Targ. THE SECOND CITY is available on cassette at £5.95 or disk at £9.95.

Mercenary II is scheduled for the end of the year if you are still hooked!

OUT OF THE FIRE!

'You find yourself in a smoke filled shop. Your task is to rescue as much software as possible and start trading again in the shortest time possible!'. That was the real life situation confronting John Spring of The Atari Center in Broad Street, Birmingham just as we delivered the last issue of PAGE 6! The people next door were not doing too well so decided to let the insurance company provide the profits! They were carted off by the police but not before a huge pall of smoke and soot descended on a lot of Atari software. Undaunted, John Spring and his staff set about stripping out the shop, re-decorating and re-stocking. Just three days later they were back in business.

The enforced lay-off gave them a chance to re-evaluate and John Spring now claims that The Atari Center is 'stronger than ever' and even more firmly committed to provide on going support for the 8-bit and VCS Ataris.

PAWN FOR 8-BIT?

The highly praised ST Adventure, The Pawn will reportedly be available on the 400/800/130XE later this year with 'no compromises on quality'. Hard to believe after seeing the ST version but if Magnetic Scrolls pull out all the stops for the 8-bit machines you could be playing the new definitive Adventure by Christmas.

DIGICOMM MIDI SYSTEM

Fancy a synthesiser? We recently received from DigiComm comprehensive details of their MIDI music system for the 400/800/XL or XE computers. Featuring a MIDI interface and 16 track Recorder software it enables you to hook up a synthesiser to your Atari and do whatever it is that computers and synthesisers do together! It is hard to comment on the system as four pages of printed information don't sound the same as Rick Wakeman(!) but if you want more details drop a line to DigiComm, 170, Bradwell Common Boulevard, Milton Keynes, Bucks, MK13 8BG.

BLOCKBREAKER

New Routines

by Dave Hitchens

In response to a request from the editor I present a joystick version of the game Blockbreaker which was published in issue 20. As a bonus, or maybe to frustrate those of you who can't get past level 2(!), I have also included an auto-play modification so you can see just how the game *should* be played.

THE MISSING HIGH SCORE FEATURE

Before we begin, however, a correction to the original program. Blockbreaker was written on a 32k Atari 400 and until very recently I was unable to test it on the XL or XE. Unless you also use a 32k machine you will find that the high score feature is not displayed between games. Fortunately the correction is a very simple one. Referring to the original listing in Issue 20, line 155 should be modified by changing the '120' in the fourth statement to 'PMB' as follows.

```
TO 155 Q=310:GOSUB 300:A=USR(MC+721):POKE
    PM+286,PMB:GOSUB 400+(PEEK(1680)=0)
```

PLUG IN THAT JOYSTICK!

I did not include a joystick routine with the original version because I felt that the use of a joystick made the game virtually unplayable since it lacks the precision of the analogue input which a paddle provides. I suppose, to some degree, it will depend on the individual's dexterity and reaction time so I've listed the modified lines below for you to try for yourself.

Type in the original program from Issue 20, or load it if you have already typed it in, and then modify it as follows.

Change the following lines

```
MA 1340 DATA 24,144,20,73,255,201,64,176,
   2,169,64,201,181,144,2,169,181,141,0,2
   08,141,5,6
EV 1543 FOR N=0 TO 22:READ D:POKE 1716+N,
   D:NEXT N
YU 1546 DATA 162,96,169,11,157,66,3,169,0
   ,157,72,3,157,73,3,152,32,86,228,32,24
   3,0,96
WZ 1722 DATA 173,7,6,208,87,173,132,2,208
   ,82,160,50,140,1,6,169,128,145,203,141
   ,6,6,141,173,6,169,2,141,8,6
```

Now add

```
QZ 1547 POKE 1737,MCB+2
SJ 1940 DATA 198,7,208,27,173,120,2,201,7
   ,208,3,238,5,6,201,11,208,3,206,5,6,17
   3,5,6,141,0,208,169,4,133,7,96
```

The 29th DATA statement in line 1940 controls the sensitivity of the joystick. Change its value (4) to alter the speed of your bat. Since it controls the delay loop, increasing its value will slow down the bat.

The code in line 1940 causes the bat to move at a constant speed. I have not experimented with an accelerating bat since I felt that this would cause further frustrations during play but if anyone wishes to dabble with the routine, ensure that your machine code fits into the listing between lines 1930 and 1950 and that it ends with an RTS (I've used location 7 as the delay variable).

SIT BACK AND WATCH

If you would like to see the game demonstrated then make the following changes and additions to the original (i.e. paddle) version of the game. Now sit back and watch Atari do all the work. Of course you could always plug in a paddle and pretend you are a real champion!

Change the following lines

```
AH 1340 DATA 32,243,0,24,144,17,64,176,2,
   169,64,201,181,144,2,169,181,141,0,208
   ,141,5,6
CR 1722 DATA 173,7,6,208,87,234,234,234,2
   34,234,160,50,140,1,6,169,128,145,203,
   141,6,6,141,173,6,169,2,141,8,6
```

Now add

```
SE 1547 POKE VB+248,MCB+2
QH 1940 DATA 173,1,6,201,103,176,15,173,3
   ,6,56,233,4,141,0,208,141,5,6,24,144,2
   3
HZ 1945 DATA 173,10,210,41,7,133,7,173,3,
   6,56,233,2,56,229,7,234,141,0,208,141,
   5,6,96
```

Blockbreaker will play forever in this mode (and introduce a minor bug at the higher levels!) so you may like to make the Atari a bit more 'human' by modifying the above version as follows.

Change these lines

```
FX 1150 POKE 756,CHB:A=USR(PM+300):FOR N=
   1 TO 2:POKE PM+615+N,248:NEXT N:POKE 7
   04,136:POKE 53256,1
JV 1945 DATA 173,10,210,41,7,133,7,173,3,
   6,56,233,3,56,229,7,234,141,0,208,141,
   5,6,96
```

The Auto routine is again situated between BASIC lines 1930 and 1950 and machine code freaks will be able to decipher the routine given the following information.

Location 1537 - the ball's (Player 2) vertical position in the PMG table.
Location 1539 - the ball's horizontal position.
Location 1541 - the bat's (Player 0) horizontal position (left edge).
Location 7 - the 'random' variable.

The bat is either 12 or 8 colour clocks wide in the Auto mode.

So there you have it. Blockbreaker playable with paddles, joystick or even a Touch Tablet! If you get hooked on it you may find that you want to go and get some paddles after all, especially if you want to get as good as that Auto mode! ●

Readers write

Dear Les,

I would like to thank all of the readers who voted for 'FIRST STEPS'. While it is nice to win a prize for all the work put into the column, it brings me greater pleasure to know that the column is appreciated by so many people. I hope that it has helped to increase your knowledge and fun when using your ATARI computer and I hope to continue to help beginners through this column for the forseeable future.

Please remember that I can be contacted directly by beginners for answers to any questions you may have. The only rule is that you enclose an SAE if you want a written reply.

Once again, thank you for all the votes.

Mark Hutchinson

Dear Sir,

I recently bought a 1050 disk drive for my 800XL. I have about 20 pieces of software on cassette all of which are double loaders. They are all originals which I have bought over the last couple of years. Have you a program which would translate my tapes to disk?

B. Hurst,
Hull

This is representative of about a dozen letters received recently and is becoming a more common problem as more users upgrade to a disk drive. The short answer to the problem is no. As far as I can gather there are no programs currently available which will translate multi-loading tapes to disk. It is not that easy to do as each program needs to be individually interpreted and many cassette programs use the area of memory that is used by DOS in a disk based system. This means that certain programs would have to be disassembled and virtually re-written. A couple of years ago several programs were advertised which claimed to transfer tape to disk, and indeed a few still are, but many of these failed to do what they claimed. I am afraid that there is no easy answer to this problem. You may just have to learn to put up with that long load from time to time.

Let's hear from you!

Other readers want to share your views or read about your problems. Drop a line to READERS WRITE, PAGE 6, P.O.BOX 54, STAFFORD, ST16 1DR. Do it now!

Dear Les,

My friend Elizabeth Barlow who is Headteacher at the Royal Liverpool Children's Hospital has asked me to appeal to all generous Atari owners for software for the children at the hospital. The hospital were given a 130XE by the TV program Scramble but they are having difficulty in finding any educational software. The children's ages range between 5 and 15 and any commercial or BASIC programs on disk or tape would be gratefully received. Would any software companies like to donate something? They are particlarly interested in LOGO but even programs typed in from magazines would be helpful.

Anything your readers or advertisers would care to donate would be gratefully received. Please ask them to send items direct to Miss Elizabeth Barlow, Royal Liverpool Children's Hospital, Hospital School, Myrtle Street, Liverpool, L7 7DG.

Thank you.

Linda Tinkler,
Liverpool

Dear PAGE 6,

I am a newcomer to computing and am still very much feeling my way. I have typed in Train Crazy from Issue 21 but have been unsuccessful with lines 40 and 45. It is very difficult to decipher some of the symbols used for example on the second line of line 40 is that a small r or a CTRL-Q?

I would also like to comment on the timing of the contents of the magazine. As the March issue was published late I was unable to get it on the 1st March and so I had to collect it on Saturday 8th March, a little late for the Exhibition. I suspect also that the Carols program in Issue 13 was a little late for Xmas 1985.

I am contemplating purchasing a disk drive and notice that you do a disk subscription. Can I buy this locally or do I have to obtain it direct from yourselves?

J. Ford,
Hornchurch

Firstly let's deal with the 'late' publication. PAGE 6 has NEVER been published late, it is always published on the last Thursday of the month preceeding publication date which, in theory, gives plenty of time for it to reach the shops and subscribers. Unfortunately from then on it is in the hands of the Post Office. I won't put into print my opinion of the Post Office!

Getting the listings right comes with experience but we provide as much help as we can to our readers. A Listing Conventions page is published in each issue so that every character in a listing can be compared and, of course, we use TYPO 3 for error checking. I can't see any lower case r in the line you mention, check each character against the table of listing conventions and you will soon see what is required. And make sure you use TYPO 3! The disks from each issue are only available directly from ourselves either on subscription or they can be purchased individually.

Dear Les,

In reply to the letter from R. Holmes in Issue 21 regarding connecting his computer to the Scart socket of his television, this can certainly be done and is relatively simple.

You will require a blank Scart plug, a 5 pin DIN plug and a length of twin screened lead. The connections are as follows (DIN to Scart)

Pin 4 - Composite Video to Pin 20 - CVBS Input
Pin 3 - Audio to Pin 6 - Audio left or Pin 2 - Audio Right
Pin 2 - Ground to Pin 17 - CVBS Earth

If the TV has stereo capability then select mono mode to get the sound to come from both channels or strap Pins 2 and 6 together on the Scart plug.

The resulting improvement in picture quality by using the monitor output of the computer through the Scart input on the TV is well worth the effort.

Wilf Harrison,
Wigan

Many thanks also to all the many other readers who wrote with advice on this. Several readers advised that ready made leads were available from Silica Shop and we received a Telemessage from Advance Computer & Software Ltd. to say that they can supply a ready made 1 metre lead for £10 fully inclusive with extra length to order at £1.20 per metre. They will also make up any leads to order for connecting videos, computers etc. where the TV has a Scart connector. Contact them at P.O.Box 2, Marks Tey, Colchester, Essex, CO6 1NW

Dear Sir,

I recently purchased an 800XL and 1050 disk drive which came with DOS 3 and Home Filing Manager. As instructed I backed up the DOS 3 using the 'duplicate' routine but could not copy the Home Filing Manager which kept giving an Error 176. Quite by chance I then read the April edition of ANTIC magazine which had a letter from a reader complaining that DOS 3 would not copy certain of his disks. In reply the editor said 'ANTIC has consistenly recommended readers not to use DOS 3. It is incompatible with practically everything. Trade it in for DOS 2.5'.

Is this problem a common one and if so where can I purchase a copy of DOS 2.5? Will I need to reformat the half a dozen or

so disks that I have formatted with DOS 3?

I hope that you can help and that this letter may be of service to other readers.

N.R.Fairclough,
Kidderminster.

PAGE 6 fully endorses ANTIC's comments about DOS 3! You should be able to get a copy of DOS 2.5 from your local Atari dealer. Alternatively send £3.95 to PAGE 6 and ask for THE XL/XE KIT disk which contains a full copy of DOS 2.5 with instructions along with several other excellent utilities.

You will need to convert all of your files from your DOS 3 disks to DOS 2.5 but there is a program with DOS 2.5 to do this for you. Once you have copied the programs across, your original disks can be reformatted using DOS 2.5. Even with DOS 2.5 however you may not be able to copy The Home Filing Manager as it is likely that Atari have copy-protected the disk as a precaution against illegal copying and distribution.

Dear Sir,

I would like to say something about TYPO 3. To my mind there are two great disadvantages and for this reason I am therefore still faithful to TYPO II. Firstly when TYPO 3 is 'up and running' pressing SYSTEM RESET erases it from memory. Secondly, and more important, to obtain the correct code with TYPO 3 one has to type in the line exactly as it stands putting in all spaces and not using abbreviations. This is tedious to say the least. Is there any way of rectifying it?

N.H.Thistleton-Smith

Dear Sir,

After reading the letter from A. Joyce in the last issue, I wish to state that I prefer TYPO II to TYPO 3. If the program is not typed in one sitting TYPO II is CSAVEd with the program and when it is CLOADed next time TYPO II is recalled with GOTO 32000 and typing can be continued. When the typing is finished and CSAVEd with TYPO then CLOADed, TYPO can be erased by typing END then the program checked then CSAVEd without TYPO.

G.F.Bradwell,
Solihull

Each to his own I suppose but it seems that many readers do not seem to understand how to get the best from TYPO 3. Firstly on the question of abbreviations. If you wish to abbreviate fine, just LIST the line after you have finished typing it, or list a batch of lines, place the cursor on each line and then hit RETURN. The correct code will be shown. SYSTEM RESET does not delete TYPO 3 it merely disables it. To get it back again just type A=USR(1536). Finally, there is no reason why you can't type a listing in several goes. Just CLOAD TYPO 3, RUN it and then CLOAD your listing. Save your listing whenever you like and load whenever you like, just make sure that you load and RUN TYPO 3 first.

Dear PAGE 6,

Could you please tell me where I could obtain the components required to build a speech synthesiser as detailed in issue 19? Are they obtainable through the post?

Eamon Roche,
Ireland

I am surprised how many people keep asking us questions like this. I thought evreyone had heard of Maplin Electronics? Maplin Electronics address is P.O.Box 3, Rayleigh, Essex and their phone number is 0702 552911. They have a comprehensive catalogue on sale in W.H.Smith which gives full details of their products which are all available by mail order. An alternative source is one of the many Tandy shops around the country.

Dear Les,

Regarding the comments in the introduction to Blockbreaker in Issue 20 about clearing RAM, I thought you might like to know of a very easy way for a program to clear RAM. In the Blockbreaker program change line 10 to line 15 and delete the GRAPHICS 17 satement and then add the following line

```
JL 10 GRAPHICS 17:Q=FRE(0)-1:DIM A$(Q):A$
   (1)="♥":A$(Q)="♥":A$(2)=A$:CLR
```

The character inside the quotes is CTRL-,. In the program this clears approximately 20k of memory in about 0.5 seconds!

Fred Ross,
Ware, Herts

Dear Les,

Your readers might be interested to know that the standard D type 9 way connectors have metal bits on that prevent them from fitting Atari joystick ports correctly. Tandy do sell replacement cables with slimline 9 way connectors but at a price!

The solution is to use a Molex connector. The part numbers needed are Model A-7298 Plug (inner) order code 15-24-4025, Model A-7298-2A (top backshell) order code 15-24-4026 and Model A-7298-2B (lower backshell) order code 15-24-4027. You will also need the metal pins but I am afraid I don't have the details of these at present. Molex can be contacted at Molex Electronics Ltd. Farnham Road, Bordon, Hants, GU35 0NU. Telephone 04203 7070.

John J. Smith,
Merseyside

Dear Sir,

I am a new subscriber to your excellent magazine which I have already found to be superior to many others. TYPO 3 is a godsend for correcting programs such as Colour Palette from Issue 20. Even so, it took my wife and I several evenings to spot the error. Other readers may like to note that in line 1160, just before the reversed capital F there appears to be a space. In fact this is a CONTROL-B. This makes all the difference!

I was disapponted not to find Atari Art and ST Gallery in Issue 21. Please consider this as a regular feature as I am sure that many readers would welcome this along with captions stating which programs and hardware were used for the creations.

Brian Perrie,
Dundee

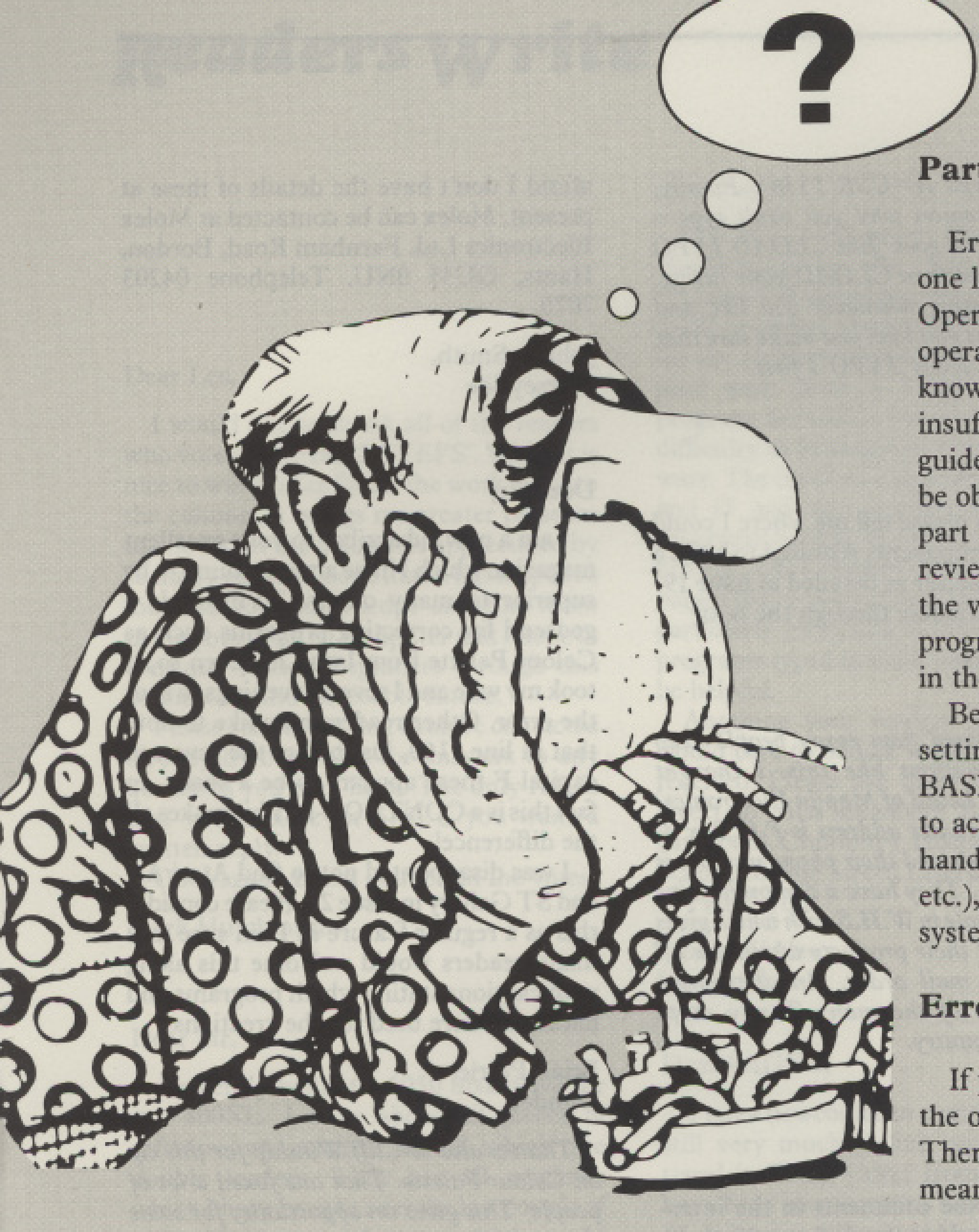
Thanks also to Cliff Winship for this tip on Colour Palette. That one foxed a lot of people! This gives an opportunity for some tips on solving some of these problems. If you take a look at lines 1160 and 1170 in Colour Palette you will see several Inverse capital letters. Find those with spaces to the left of them and you will see that the left side of the Capital is very 'thin'. Now compare the Capital F on the second line of 1160. It doesn't look the same does it? The 'space' to the left of this cannot therefore be a space. Check the listing conventions on page 12 and the only thing it is likely to be is a CTRL-B. Replace the space with CTRL-B and you will find that TYPO pops up with CI instead of CG. Solved! When you get problems with other listings, that's how closely you have to check them!

We would love to feature Atari Art in every issue but it is expensive to print colour features so they will at present appear only once in a while, besides which nobody has sent us any good pictures lately!

Dear Les,

Here's a quick tip for readers who have gone over to DOS 2.5 from DOS 3. If you are using an 850 interface make sure that you have all the files from DOS 2.5 on your master disk. It was not until I got a full DOS 2.5 disk that I found that the SETUP.COM file enabled an AUTORUN.SYS to be created which will boot the interface. DOS 3 used to do it automatically.

M.J.Orme,
Burton-On-Trent



If you are still tearing your hair out because that error was not covered in the first part of Steve Pedler's article, fear not, the concluding part of this article brings you all the other error codes you are likely to encounter on your Atari.

A Guide to Atari Error Codes Pt.2

by Steve Pedler

Part 2 - Operating System Errors

Error codes from 128 onwards are not specific to any one language, since they are codes generated by the Operating System (O.S.) following an input/output (I/O) operation. To fully understand these codes, a working knowledge of the I/O subsystem is necessary. There is insufficient space in an article intended to be a reference guide to go into this in detail, but further information can be obtained from the sources listed at the beginning of part 1 of this article. I have however found it necessary to review certain aspects of the I/O system when discussing the various error codes and I hope that more experienced programmers will forgive any generalisations I have made in the interests of clarity and simplicity.

Beginners should remember that most of the work in setting up IOCBs and calling the OS is done for you by BASIC. Many of these errors will not be seen until you try to access peripherals directly by using BASIC's file handling commands (OPEN, CLOSE, PUT, GET, XIO, etc.), or by setting up the IOCB and calling the operating system routines directly.

Error-128 BREAK abort.

If you press the BREAK key during an I/O procedure, the operation is aborted and this status code returned. Therefore, never press BREAK during I/O unless you mean to stop the operation.

Error-129 IOCB already open.

See error 134 for a brief explanation of the IOCBs. Any given IOCB can only be open for one purpose at any time. If you try to open an IOCB that is already in use, this error code is returned, even if the second operation is identical to the first. Always CLOSE an IOCB before using it again. (Note that trying to CLOSE an already closed IOCB does not generate an error.)

Error-130 Nonexistent device.

After setting up an IOCB (see error 134) the Central Input/Output utility (CIO)determines from the data in the IOCB the nature of the device you wish to use. It then looks up the address of the device handler (the software which actually performs the operation) in an area of RAM called the Handler Table (38 bytes starting at location 794). Each entry in the table consists of three bytes (two additional bytes are unused), the identifier code for the device concerned (C for cassette, E for screen editor etc.) plus the address in low and high byte format of the handler software.

On powerup five handlers (the 'resident' handlers) are specified in the table (Cassette, Editor, Screen, Keyboard and Printer). These handlers are located in the OS ROM. Others (the non-resident handlers) are either booted in (such as Disk or RS232-C handlers) or can be added later. CIO searches the table for the appropriate device, but if the handler is not present in the table error 130 is

returned. To see this, try the following. POKE 797,65 will replace the identifier for the cassette handler with the ATASCII value for the letter A. Now try a CLOAD. Error 130 will be displayed as CIO thinks the cassette handler is not present in memory.

Error-131 IOCB write only.

Before you can do anything with a peripheral, you must first OPEN a channel (IOCB) to it. The OPEN command will specify whether data is to be read from or sent to the device. (This is of course done automatically with certain BASIC commands such as SAVE, LOAD, LPRINT etc.) If you OPEN a device to send data to it and then try to read data from it, this error results. You will then have to CLOSE the channel, and reOPEN it for read or read/write (update).

Error-132 Invalid command.

On setting up an IOCB, one of the necessary pieces of information you must supply is a command code which indicates the type of action you wish CIO to take. All peripherals share a series of common codes for open, close, put/get bytes, etc. (although not all functions are available for each device - see error 146). In addition, there are a number of 'special' codes which are specific to certain devices, such as the disk drive and screen handler. Error 132 occurs when either the common code is incorrect, or you have issued a 'special' command to a device which doesn't have any special commands.

If this error occurs from BASIC, you should check the command POKEd into the IOCB, or the XIO command number (the number immediately following the XIO statement).

Error-133 Device or file not open.

This error occurs when trying to access a file or device that has not been OPENed. A common cause of this is a mistake in your file specification, either on OPEN or when trying to access the device.

Error-134 Bad IOCB number.

The Atari maintains a series of eight Input/Output Control Blocks (IOCBs) in RAM, commencing at location 832. Each IOCB (numbered from 0 to 7) is 16 bytes long, and into this area is placed the information needed by the O.S. to perform the required action. This includes a command code indicating the operation that is required, the source or destination of the data to be transferred, how much data to transfer, and any information that may be specific to the device concerned. BASIC sets up an IOCB automatically when performing I/O operations, but you can also set them up yourself from BASIC or assembly language. Once the IOCB is ready, a single machine language call to the Central Input/Output Utility (CIO) will pass control to the O.S. for the procedure to be carried out. CIO will in turn call the specific device handler. If the I/O procedure uses the serial bus (cassette, printer, etc.) the handler will set up another area of RAM called the Device Control Block (DCB) and will then call the Serial Input/Output Utility (SIO) to do the actual data transfer.

When performing I/O operations therefore you must specify the IOCB to be used. BASIC always uses IOCB 6 for the screen handler, IOCB 0 for the screen editor and IOCB 7 for LPRINT. When using OPEN, CLOSE, PUT, GET etc. you specify the IOCB in the number immediately following the command (e.g. OPEN #1, CLOSE #4). With XIO, the first number is the command, the second is the IOCB to be used (e.g. XIO 18 #6).

Since BASIC reseves IOCB 0 for the screen editor, you cannot use this from a BASIC program, error 20 (not error 134) occurs if you try. You can however use IOCB 0 from machine code.

In assembly language, the IOCB number is placed in the X-register for use as an index. Because each IOCB is 16 bytes long, the IOCB number must be an exact multiple of 16 (including 0) and not be greater than 128. If this is not adhered to, the IOCB number is wrong and error 134 is the result.

Error-135 IOCB read only error.

This is the exact opposite of error 131. It means that you have attempted to read from a device opened only for write. You will have to CLOSE the device and reOPEN it for read or read/write (update).

Error-136 End of file.

Not so much an error as a status code indicating that when reading data from a device you have come to the end of the file.

It can be useful to check for this code when you don't know precisely how much data is present in the input file. You could then instruct CIO to read a block of data you know is larger than is actually present in the file and check for this error code (using TRAP in BASIC to prevent the program from stopping). The actual amount of data transferred is recorded in the ninth and tenth bytes of the IOCB used (see Mapping the Atari pp. 82-89).

Error-137 Truncated record.

The Atari O.S. supports two main types of I/O procedure - byte oriented and record oriented.

With byte oriented transfer, you simply specify the memory location where the data to be transferred is located (output) or where it is to be stored (input), and the number of bytes to be transferred. The operation continues until the specified number of bytes is moved, or the end of the file is reached, regardless of the nature of the data. If you are inputting data and you have not reserved a large enough area (buffer) of RAM for the incoming data, then data input is not halted - it just overwrites whatever follows the buffer (program lines, screen memory etc.).

In record oriented transfer, input or output only continues until an ATASCII end-of-line (EOL) character is reached. If on input your allocated buffer size is exceeded before an EOL is reached, then only part of the data is input and this error is returned, indicating that the record is truncated.

continued overleaf

The BASIC command for record oriented input is INPUT. When using this command, BASIC allocates a maximum buffer of 119 bytes (according to the DOS 3 reference manual). If you use INPUT to read a file created using byte oriented transfer (PUT in BASIC) you may run into this error.

Error-138 Device timeout

This is an error generated by SIO following I/O which uses the serial bus (e.g. printer, disk, cassette). For each device the device handler sets a finite amount of time by which the device must respond to the command sent - the device 'timeout'. 'Intelligent' peripherals such as the printer or disk drive can actively acknowledge the command and so the timeout value is short. If this error occurs with these devices the usual cause is that the device is not connected or switched on, or the printer is not switched to on-line.

Unfortunately, the cassette recorder is not an 'intelligent' device and cannot respond in this way. If you try to output to the cassette and it is not connected, or Play and Record have not been depressed, then the Atari has no way of knowing this and continues to send data regardless until it is all sent. This is the reason for the audio prompts when using the cassette recorder. When inputting from cassette, the Atari waits until the recorder starts to send data. If it does not do so within the timeout period (about 37 seconds according to Mapping the Atari) then this error is generated and the cassette motor is stopped. Potential causes for this (other than the obvious ones) include excessively long tape leaders or incorrect measurement of the baud rate (sometimes seen when trying to load progams recorded on another recorder to your own). If this persists in happening with programs recorded on your own system, then have your recorder checked.

Error-139 Device NAK.

There are a number of possible causes of this error which is, to a certain extent, dependent on the device. One possibility is that an illegal command was sent to the device such as trying to access a bad disk sector or one not present on the disk (e.g. a sector number greater than 720 on a single density disk). Check the syntax of the command passed to the device.

This error may also occur during the use of the 850 interface module, see the 850 Manual for further details. The error may be returned when using the printer if the printer is not switched to on-line.

Error-140 Serial bus error.

The ROM location 53775 (SKSTAT - D20F hex) holds the current status of the serial I/O port and keyboard. If bit 7 of this register is set it means that data received from the peripheral has become scrambled, e.g. data bits are missing or unwanted ones added. This error is then returned to the user.

According to the DOS 3 reference manual, this is a rare error. I have only seen it once, when first adding a printer to my system, and it occurred due to a bad cable connection at the printer end. If this error persists, then Atari suggest having the offending peripheral or computer checked.

Error-141 Cursor out of range.

Each graphics mode has its own particular resolution (the number of points which can be plotted on the screen). You must stay within the limits of resolution for the mode you are using, and if you exceed the limits for that mode then error 141 is the result.

If this seems an unusual error to find amongst the I/O error codes, remember that the Atari treats the screen and keyboard just as any other peripheral. PRINT and PLOT operations are considered to be I/O procedures, and when you change graphics modes you are in fact OPENing a channel to the screen handler.

Error-142 Serial bus data frame overrun.

The Atari serial port receives data one byte at a time, with the eight bits of that byte arriving one after the other (i.e. in serial fashion rather than parallel fashion, when all eight bits arrive together). The incoming byte must be processed before the next can be dealt with, but the peripheral doesn't wait for the computer - it sends the next byte regardless. If the next byte arrives while the computer is still processing the first, then the data is said to have 'overrun', and error 142 results.

Note that SKSTAT (see error 140 above) contains the serial port status, and if data overrun occurs then bit 6 is set, not bit 5 as stated in the DOS 3 reference manual (see the hardware manual p. III.18). Once again, Atari suggest that if this error occurs more than once the computer should be checked.

Error-143 Serial bus data frame checksum error.

When data is sent to the computer from the peripheral, a checksum byte is also sent at the end of each block of data. This is a single byte consisting of the sum of all the other bytes in the data frame. On receipt of the data SIO calculates its own checksum and compares it with that sent by the peripheral. This procedure is intended as a check of the accuracy of the data being sent compared with when it was recorded. If the checksums don't match then this error is returned.

There are a number of potential causes. The initial recording of the data may have been faulty due to a defective disk or cassette, or the peripheral itself or the I/O connections may be faulty. This error is usually seen with the cassette recorder due to the inherently unreliable nature of cassette storage. If it persists with data recorded and played back on your own system, then have the recorder and/or computer checked.

Error-144 Device done error.

This error occurs when you have issued a valid command to the peripheral but the device is unable to carry it out. For example, you may have tried to write to a disk that is write-protected, or there may be no disk at all

in the drive. 'Your Atari Computer' implies that this error might also occur if the disk directory was damaged in some way.

The cause of the error depends on the device, so check the command given and whether the device is prevented in some way from executing it.

Error-145 Read after write compare error or bad screen mode.

This error has two potential meanings. When the disk handler writes a file to the disk, it reads the file after writing it as a check of the accuracy of the recording. If there is a difference between the file as written and what should have been written this error is returned. Possible causes would include a defective disk or faulty drive, although write errors do occur on occasion for no apparent reason. Try resaving the file onto another disk to see if the error recurs.

The second cause of this error is if you try to choose a graphics mode not implemented in your computer. For example, the original 400/800 machines have no graphics modes from 12 to 15. Selecting one of these modes on a 400/800 will result in error 145.

Error-146 Function not implemented.

As indicated in the explanation of error 132, all device handlers share common command codes for a series of operations. These include the commands to OPEN, CLOSE, get STATUS, PUT/GET RECORD, and PUT/GET BYTE. Clearly, not all of these operations are possible with all peripherals, so that (for example) you cannot send data to the keyboard or get data from the printer. Attempting to do one of these impossible operations will generate error 146.

Error-147 Insufficient RAM.

This error code is very similar to BASIC's error 2 (see this error for a brief explanation of how the Atari keeps track of memory usage). Whenever you change graphics modes, the value in MEMTOP (741,742) is changed accordingly, being either increased or decreased depending on the memory requirements of the mode selected. If the change of mode would lower the value in MEMTOP so much that it would be lower than that in APPMHI (14,15) then the screen is returned to graphics 0 and error 147 is returned.

This error is not likely to occur in machines of 48K or more, but certainly could occur in 16K machines with a large program using high resolution modes such as graphics 8-11 and 15. There is only one solution - add more memory.

Errors 150-154 are devoted to the use of the RS232-C serial ports. I have not included explanations for these errors here (mainly because I don't fully understand them) but also because anyone using these ports would presumably have access to the 850 Interface Manual or equivalent. These error codes are fully documented in that manual, to which reference should be made.

Error-160 Drive number error.

You can attach up to four disk drives (numbered 1 to 4) to your Atari, but with standard DOS 2.5 the default number that can be hooked up is two. This is because each drive in the system needs a 128-byte buffer reserved for it. Since the majority of users are unlikely to want (or need) more than two drives, the default is two to conserve memory. With standard DOS 2.5 then, attempting to access a disk file with a drive number that is neither 1 nor 2 will result in error 160. If you wish to connect up more drives, a simple modification to your DOS will be needed.

Under certain circumstances however, you can use drive numbers between 1 and 8 without error. For example, if you own a 130XE, you can use the RAMDISK utility of DOS 2.5 to set up the extra 64K of RAM for use as a virtual disk drive, in which case the 'drive' takes on the number 8. The point at which this error is generated therefore, will to a certain extent depend on your system; however, the drive numbers must always be in the range 1 to 8.

Error-161 Too many OPEN files.

DOS 2.5 allows you to have a maximum of three open disk files at any one time (although you can have files open to other devices as well). This is because each open file has a 128-byte buffer associated with it, and DOS 2.5 only provides for three such system buffers. I am not sure whether it is possible to modify DOS to allow more open files than this. If this error occurs, you should check for the presence of any file(s) opened unnecessarily, and close them to free them for further use.

Error-162 Disk full.

This means that there is no further free space on the disk for saving programs or data. If this occurs and you don't have another formatted disk with enough free space available, the only way out is to use the cassette recorder to save your program, format a new disk, then reload the program and put it onto the empty disk. Moral: always have a ready formatted spare disk or two to hand.

Error-163 Unrecoverable system data I/O error.

This error appears to act as a catch-all for any I/O error not covered by the other I/O error codes, and for which the cause cannot be determined. It appears to be a very rare error. Suggested causes are malfunctioning equipment, corrupted DOS, and damaged disks (though there are presumably others).

Error-164 File number mismatch.

There are two possible causes of this error. The first relates to the use of the POINT statement. Having OPENed a disk file, you can refer to any byte within that file by moving an internal pointer with the POINT command. To do this you must specify: the channel

continued overleaf

number on which the file is open, the sector number and the byte number within that sector. If the sector specified by you does not form part of the OPEN file, this error is returned to you. POINT can also generate other errors - see errors 166 and 171.

The second cause of this error will hopefully never be seen with today's reliable disk drives. Disk files are stored on the disk as sectors of data, each sector holding 128 bytes. Of these, only 125 bytes are program data, the other three hold information needed by the disk drive. This includes the file number as present in the directory, and the number of the sector holding the next part of the file (i.e. the next sector to be read or written to). When moving to the next sector, the drive checks that the sector does indeed belong to the correct file. If the file number does not match, then error 164 is returned. This shouldn't be seen with present day drives, but was apparently a fairly common problem with the early 810s. If it occurs and you haven't been tampering with the disk structure, your drive may need servicing.

Error-165 File name error.

The Atari only allows the use of the letters A-Z (uppercase) and numbers 0-9 in disk filenames, plus the wildcard characters '*' and '?'. Any other character in a filename will cause this error.

Although the wildcard characters are legal, they are not so when creating a file, only when reading from an already existing one. The reason is fairly obvious, you shouldn't create ambiguous file names, and attempting to do so will return this error.

Error-166 Point data length error.

See error 164 for a description of the POINT statement. When using POINT, you must specify the byte number within the indicated sector. This number must be in the range 0-125 inclusive. If it is not, then this error is the result. See also errors 164 and 171.

Error-167 File locked.

Once a disk file is locked, the only thing you can do with it is read it. You cannot write to it in any way, delete it or change its name. Trying to to do any of these things to a locked file generates error 167. You will have to unlock the file using DOS 2.5 option G or XIO 36 from BASIC.

Error-168 Command invalid.

Take a look first at error 132. What is the difference, you might ask, between these two errors? Certain device handlers, notably the disk drive, RS232-C and screen support 'special' command codes in addition to the common codes used by all devices. These are device-specific commands, and for the screen handler are draw and fill. The disk handler has seven special commands: rename, delete, lock, unlock, point, note and format. Error 132 will occur if you issue a special command to a device whch doesn't have any special commands associated with it. Error 168 occurs if the device concerned does have special command codes, but the code you used is not recognised by the handler. You should check the command issued to the device (e.g. via a XIO statement).

Error-169 Directory full.

The 810 and 1050 disk drives from Atari only allocate 8 sectors on the disk for the directory. These 8 sectors allow you to make a total of 64 directory entries (i.e. 64 separate files on the disk). In practice, this should be enough for anything, and you are much more likely to fill the rest of the disk before you exceed this limit. If you do exceed it, error 169 is generated and you will have to use another disk.

Error-170 File not found.

The file name you use for any operation must match exactly one of the file names on the disk. Even if it differs by only one character, if it doesn't match an entry in the directory the disk handler will be unable to find the file and will return this error. The usual cause is inserting the wrong disk in the drive or a typing error when entering the file name.

Error-171 Point invalid.

The next step after a POINT (see errors 164 and 166 for further details) is usually to read (using INPUT or GET) the byte pointed to, or write to it using PRINT or PUT. It is clearly not possible to read past the end of the file, and attempting to do so will cause error 136 (end of file). (There is a mistake in the first edition of Your Atari Computer p. 262, where attempting to read past the end of the file is given as error 170.) It is quite undesirable to write past the end of the file, since you might overwrite part of another file. If you try to do this, then error 171 is returned.

Users of DOS 3 should be aware that NOTE and POINT are treated differently by this version of DOS, since they return a pointer offset from the start of the file rather than an absolute location in terms of sector and byte numbers. The meaning of the error codes related to POINT is however the same.

CONCLUSION

There are in addition to the errors listed so far six errors identified in the DOS 3 Manual but not in earlier Atari publications. I presume that these are errors specific to DOS 3. I do not intend to deal further with these error codes since Atari owners should no longer be using this version of DOS.In any case, they are fully documented in the above manual.

I hope you have found this guide useful in interpreting the sometimes obscure error codes produced by the Atari computers. I would be very interested to hear any comments, further information or corrections (I hope there won't be too many of those!) that you may have. Further information on the inner workings of the Atari resulting in these codes can be obtained from the sources listed at the start of this article. ●

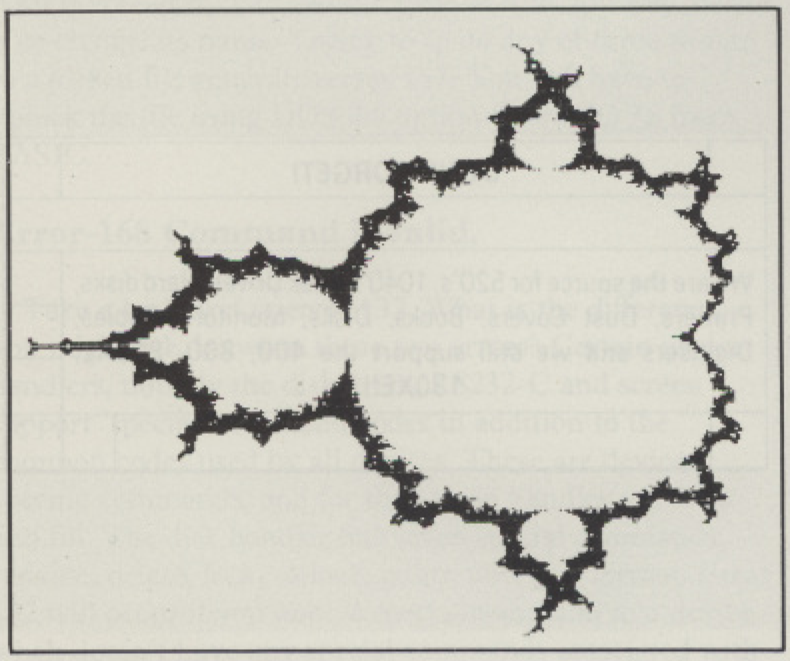
Fractals

Fractals seems to be the subject that the whole computer world is talking about at the moment and this article by Peter Coates provides you with the background to the fascinating world of fractals and gives hints on how you may write your own fractal generating program on the Atari.

by Peter Coates

Readers of Page 6 may have come across graphical representations of fractals in a variety of forms - the artifical landscapes generated in some games programs, trees used as examples of recursion, and the colourful and complex patterns employed to demonstrate the graphics capabilities of modern micros. In this article I will be concerned with the last group, as these have the greatest variety of complex and attractive patterns. They are usually associated with the name of Benoit Mandelbrot, who did much to publicise them. For some outstanding examples of fractals, the reader is advised to beg, borrow or steal (not really!) a copy of his book 'Frontiers of Chaos'. I will also show you how to program your computer to generate these patterns.

It is not generally realised that fractals arose from a branch of abstract mathematics which studies the chaotic behaviour of some functions. By this I mean that the value of one of these functions will change dramatically for quite small shifts in the value of one of the variables. This behaviour is quite different from that of the classical functions of mathematics, whose values in general change smoothly and continuously. A geometrical example of a fractal often quoted is the coastline of an island. If asked to determine its length, we might take a map of the island and measure the length of the perimeter. If we found a map on a larger scale and repeated the exercise, we would obtain a greater value, because small inlets and corrugations not present on the first map have to be taken into account. As the scale is magnified, the length continues to increase, and eventually we have to add in the contributions from rocks, pebbles and even grains of sand. Moreover, as we do this, we would notice an interesting fact; whatever the level of magnification, the sections of coastline being measured have similar shapes, with unresolved detail waiting to be exposed.



The Mandlebrot Set

A coastline is a simple example of a fractal, but it illustrates the point that forms in nature are often much more complex than the simple shapes of classical geometry. However, even the complex fractals of Mandelbrot may be generated with a relatively simple computer program, and I will now describe how to do this. It should be emphasized that the technique given is only one example, and that there is plenty of scope for experimentation with other functions and methods.

We consider the effect of a simple process applied repeatedly to a complex number which initially represents the position of a pixel (i.e. a picture element) on the screen. A complex number z is given by

$$z = x + i^*y$$

where x and y are the horizontal and vertical coordinates of the point, and i is the square root of -1. If you are not addicted to complex numbers, don't worry, as the calculations will all be given in terms of the real numbers x and y. The process we shall use here is given mathematically by

$$z(k+1) = z(k)^2 + c$$

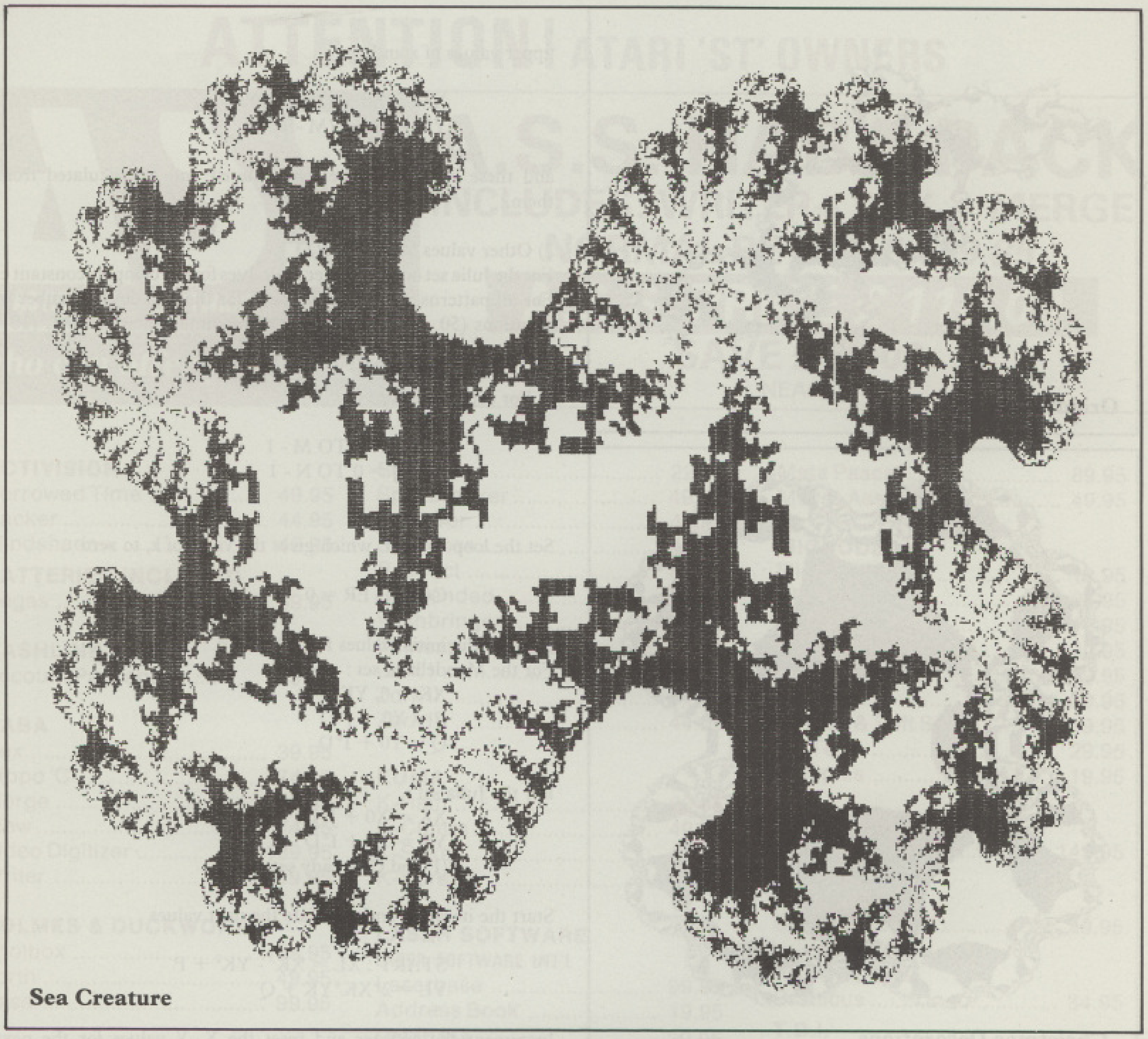
where c is a complex constant

$$c = p + i^*q$$

In words, this equation says that we form the next (k + 1)th term in the sequence from the preceding one by squaring it and adding the constant c. What is likely to happen? Clearly, if both z and c are small, successive terms will quickly become very small. Equally, if z and c are large, then the terms will increase very rapidly. In the regions between, the terms may wander around for some time before deciding whether to become small or go off to infinity. The magnitude m of a complex number, by the way, represents its distance from the origin and is given by

$$m^2 = x^2 + y^2$$

To generate a fractal pattern, therefore, we count the number of times that the process must be applied to the initial value before m^2 for the term z(k+1) exceeds a specified value L. As it may be shown that, once m has exceeded 2, the magnitude increases rapidly, convenient values for L lie between 10 and 100. Also, as some points stay small in magnitude and will never exceed the limit, and we don't want to spend for ever looking at them, we terminate the process after a given number of repetitions, k. The number of repetitions counted, k, can therefore take values for each point from 1 to the upper limit k. To colour the pattern, we relate k to one of the available colours on our output device with what we may call a colouring rule. For example, we might colour values of 1 to 10 as blue, 11 to 20 as orange, and so on. The rule is quite arbitrary, and



Sea Creature

may be varied to improve the appearance of the fractal obtained. Although the more attractive patterns are obtained with high resolution graphics with many colours, such as may be achieved with the new Atari ST machines, I hope the examples provided with this article, produced on my old 800, show that interesting patterns may be generated in black and white. I output the patterns directly to my Kaga NLQ printer to achieve higher resolution than that available on the screen.

At this point, I shall complicate the issue a little (or even further, I hear you say!) by pointing out that two types of fractals may be generated with the procedure described. The Mandelbrot set is obtained by setting the first term of the sequence equal to zero, and relating the constant c to the point being coloured by

$$p = x \; ; \; q = y$$

The Julia set, on the other hand, is obtained by setting the initial value

$$z(0) = x + i^{*}y$$

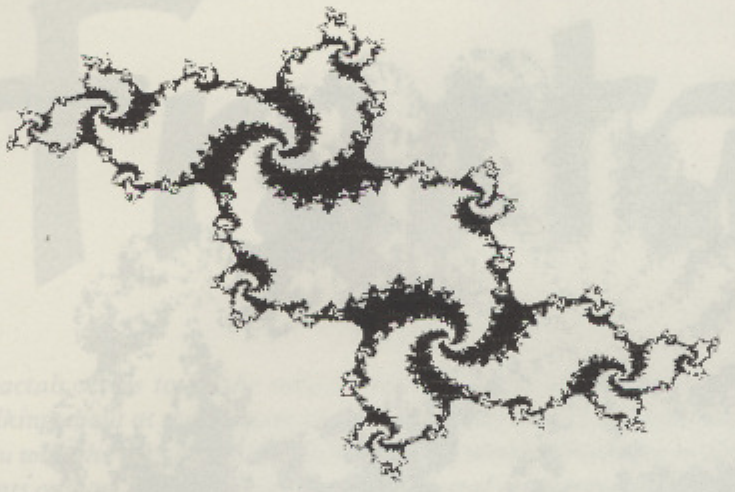
and assigning c a value which is fixed for the whole pattern. The differences between the two in practice are that in the Mandelbrot set we may change not only the position but the magnification, and this gives a very great variety of complex patterns, while the Julia patterns, on the other hand, are plotted over the whole of the range of interest, i.e. x, y = -1.5 to +1.5, and only the value c is changed. However, the Julia set possesses a degree of symmetry which I find attractive, and requires lower numerical resolution. All the examples shown come from the Julia set and were plotted using a FORTH program with 16-bit fixed point arithmetic, which is considerably faster than Atari BASIC.

The first printout shows the whole of the Mandelbrot set, with a horizontal range for -1.7 to 0.5, and -1.1 to +1.1 vertically. The colouring rule was very simple; values of k below 12, on the outside of the figure, and equal to the maximum, 200, around the centre, were left blank, while all points with k between 12 and 199 were printed black. The most interesting behaviour of both the Mandelbrot and Julia sets is found in and around the black area.

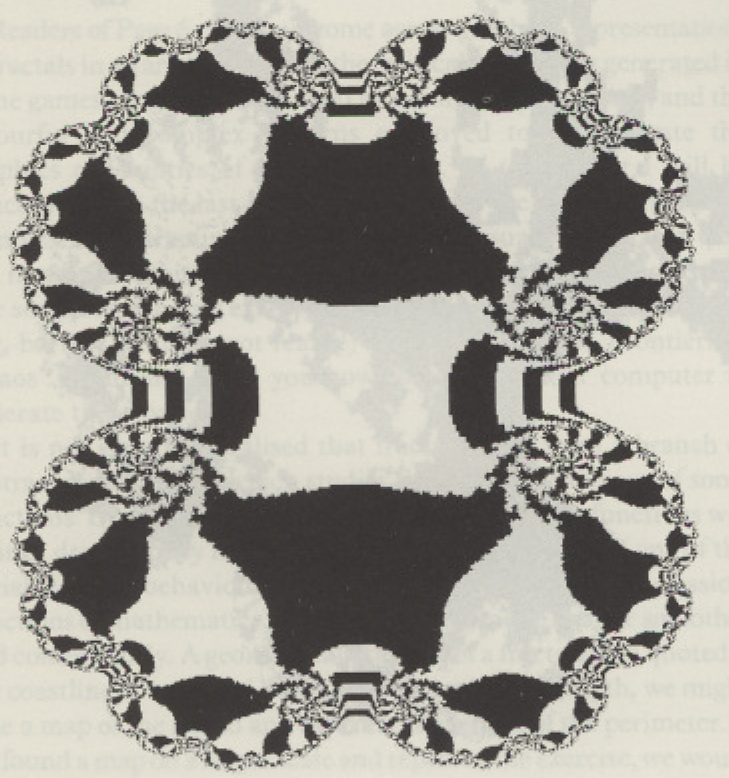
So let's look at the programs required to generate fractals. As the systems available to Atari users will vary, I haven't tried to present a complete program, but with the comments provided it shouldn't be difficult to modify these notes to produce a program for your computer.

1) Initial values : ENTER N, M, X0, Y0, D
The plotting area is assumed to contain N pixels horizontally and M vertically. X0 and Y0 are the coordinates of the bottom left-hand corner, and D is the interval between pixels in mathematical units. I prefer to keep the spacing constant in both directions, but you can change to different values DX and DY if you wish. It follows that the

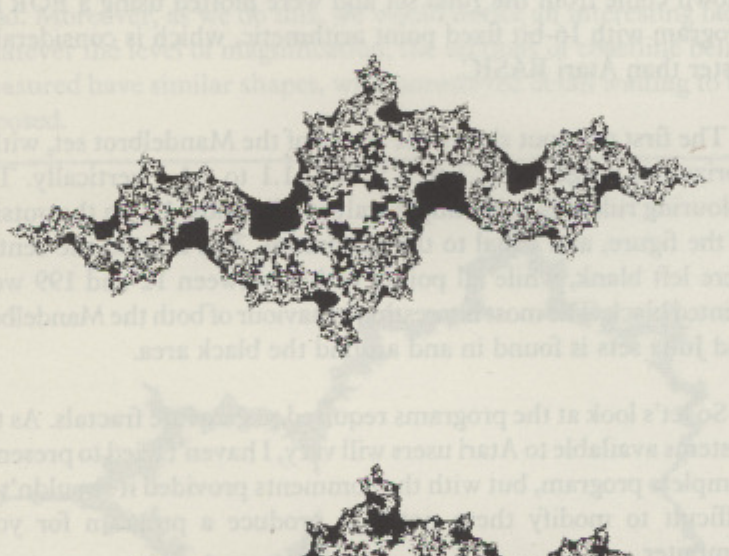
continued overleaf



Oriental Design



Christmas Decorations



Black Dragons

upper values of x and y are

XM = X0 + (N - 1)*D
YM = Y0 + (M - 1)*D

and these can alternatively be entered and D calculated from them.

2) Other values : ENTER P,Q
For the Julia set only, we enter the values for the complex constant c. For all patterns, we set the value K for the maximum number of iterations (50 - 1000), and for the maximum amplitude L (10 - 100).

3) For each pixel e.g.

FOR I = 0 TO M - 1
FOR J = 0 TO N - 1

Set the loop counter, which gives the value of k, to zero

COUNTER = 0

Now set the initial values for z(0) and c.
For the Mandelbrot set :

XK = 0, YK = 0
P = X0 + J*D
Q = Y0 + I*D

For the Julia set :

XK = X0 + J*D
YK = Y0 + I*D
(P and Q already set)

Start the iteration and calculate the next values

START : XL = XK^2 - YK^2 + P
YL = 2*XK*YK + Q

Increment the counter and reset the X, Y values for the next stage

COUNTER = COUNTER + 1
XK = XL : YK = YL

Loop back if the magnitude of the new value is less than L, and the maximum number of iterations has not been reached

IF XK^2 + YK^2 < L AND COUNTER < K THEN GOTO START

4) Colour pixel (I,J) according to the value of the COUNTER and the colouring rule, usually written as a set of IF ... THEN statements. Then move on to the next pixel

NEXT J : NEXT I
END

Be warned that fractals take an enormous amount of computing time; 'Sea Creatures' took almost *six days* to produce, even with the faster FORTH programming. So it is a good idea to run the program first with low resolution (N and M), to see whether it looks interesting, and to improve the resolution when you have the parameters and the colouring right. It is possible to store the values of k for smaller patterns, and to study the effects of different colouring rules, but for large patterns the storage required, one byte per pixel, becomes excessive. ●

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NEWS

Magnetic Scrolls, whose first Adventure The Pawn set a new standard for Adventures on the ST, have reached a distribution agreement with British Telecom's **Rainbird Software** and promise to follow up The Pawn with six new products commencing with The Guild of Thieves this autumn. ST owning Adventure addicts are in for a good time as Rainbird will also be releasing titles for **Level 9**, commencing with a trilogy comprising of a re-written set of Colossal Adventure, Dungeon Adventure and Adventure Quest. Improvements will include the addition of graphics and the implementation of Level 9's latest parser. Other similar releases are planned for later in the year and Level 9 will continue to release other adventures on their own label.

Metacomco have re-launched their ST products with upgraded versions of Lattice C, Pascal and Assembler which will include a new GEM based command shell called Menu+ which is available in its own right. Menu+ allows programmers to use pull down menus and the mouse to control programs without complicated command lines and allows single programs or batches to be run. Price is just £19.95.

Hippo Software of California continue to bring forth a multitude of software and peripherals for the ST all of which are mentioned in an excellent newsletter released to the trade called HippoNews. Hippo have a Black and White digitiser priced at $139.95 with a colour version planned. For the same price you can have an EPROM burner or for a little extra you can have a computer controlled robot. New software includes HippoConcept, an 'idea processor' that allows you to organise your thinking and updated versions are available for earlier Hippo software. Altogether Hippo have 14 software products and 6 pieces of hardware for the ST. Availability in the U.K. is not known at present but if you contact any of the ST advertisers in this issue they may be able to let you know.

Snippets from **Atari** include ... a PC/MS DOS emulator as an add on cartridge for the 520ST, 1040ST and 2080ST(!) and a BBC emulator which is claimed to run BBC software as fast as the BBC machine. What with the famed Macintosh emulator developed by a third party it looks like the ST is the machine to buy if you can't make up your mind!

Mirrorsoft have announced ST ART a new painting package developed by Andromeda Software which can handle both graphics and text, allow A4 print-outs for leaflets etc. and allow animation through colour cycling. Scheduled for release in July, the provisional price is £29.95.

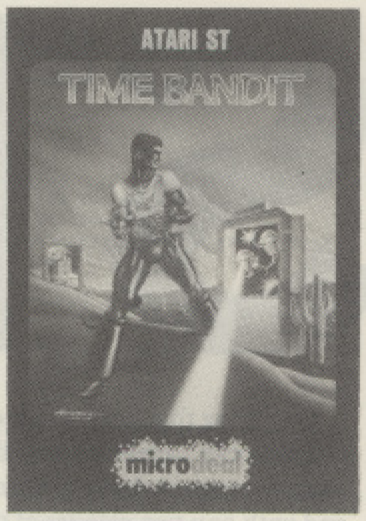
Haba Systems say they plan to introduce a new title for the ST every month and May saw the release of Haba Spelling Checker designed to work with HabaWriter. Also released is a new database called Habaview which uses the GEM environment and has 'powerful sorting and selection capabilities' optimised by the large memory available on the ST. Price is £74.95.

Prospero Software have added to their range of languages with Pro-Pascal, a full and complete standard Pascal compiler that will allow all kinds of applications to be written for the ST. Dr. Mike Oakes of Prospero states that there is a new breed of computer owner in purchasers of the ST, professional people who want to have the machine do useful things. Prospero's Pascal will allow software authors to take advantage of that new market with applications, utilities, expert systems and more. ●

REVIEW

TIME BANDIT

Microdeal
£29.95
Requires Colour monitor



This program comes in an attractive and colourful box with a well written booklet which explains some of the basic details of the game and starts with a poem. On opening the first page I was afraid someone had once read the Epic of Gilgamesh, but the poem is only one page long. The details are concise and enough to get you started and there is nothing complicated beyond the usual arcade game rules except that you do have mysteries to sort out as well as zapping unfriendly creatures. My only complaint is that the book is crudely stapled and the disk is loose in the box.

It is well worth curbing your impatience to try the game out and just let it cycle through its auto routine, this way you will get used to the inhabitants and not die so quickly!. When I played it first, I was so interested in the superb graphics that the game was over before I knew it. A lot of time and effort has gone into this game and it really shows in the detail as the game progresses.

Basically Time Bandit is a maze style arcade game, reminiscent of 'Wizard of Wor'. You start of on a planet with around a dozen timegates, shaped differently (starship, hotel, pyramid etc). Just walk through one of the gates and you appear in different lands, each more varied and dangerous than the last. To survive you must find a key to open the way out, but you will also find some valuable treasures as you wander through the locations. These add to your score and give you a chance to acquire valuable lives. There is a tendancy to play this game in the usual fast and furious arcade style. Taking it easy will not get you a good reputation as an adventurer (shown on the screen) but you will last a bit longer. The death throes of the enemy have got to be seen to be believed and some of the humour is very subtle!

There is something here for everyone, you can play Pac Man, wander around the 'Enterprise', bust ghosts, solve mysteries and more. The best thing about this game is that you can try all the locations on a simple level by entering them only once, take just one level and enter it time after time so increasing the level of difficulty, or do a combination of both. Your score will be recorded upon your death, and if the disk is protected the error is trapped and the game goes on. 'Wizard of Wor' was the only game of this style (I detest the word genre!) I enjoyed until I had the loan of this, and Microdeal might have a fight on their hands to get it back again!

I would thoroughly recommend this game, and as yet I have found no bugs and only one complaint, the hero moves and shoots in only four directions. It is well worth getting your local ATARI dealer to set up the demo screen, and if he has not obtained it tell him to contact the lovely Jenny Pope at 0726 68020.

Two small hints, as you stumble through the graveyard and you come across an interesting tombstone, think twice about digging it up and do not forget to try other exits such as ladders or holes.

Mark Hutchinson

ST SPRITES

One thing that helps a games programmer more than anything else is sprite capability and the ST is endowed with sixteen bit square sprites in the same resolution as that chosen for the screen and with any two colours of that available to the screen, i.e. any two colours out of the sixteen available for low resolution of 320 x 200 and any two colours out of the four available for medium resolution of 640 x 200. You could mix sprites to give more colours per sixteen bits square and many more things but so as not to confuse I will endeavour to show the rudiments and leave the talented stuff to you.

For those who want to understand the 68000 listing and are used to other microprocessors, remember that the memory for the 68000 is stored in bytes, words and longwords (.B .W and .L). Bytes are eight bits long, words are sixteen bits long and longwords are thirty two bits long. Each is stored in memory as in any computer but the longword for instance will take up four byte spaces (4 x byte=32 bits) and it will be stored in memory in , as I would say, the right way round, that is most significant first then next significant byte and so on. I think it was done to confuse us mere 6502 programmers! Each byte, word or longword can be put in the data registers (accumulators), a D stands for a data register and there are eight of them e.g. D0,D1, and so on up to D7. Each of these registers is very flexible and can work on up to 32 bit data with one operation. Wow! The address registers are not quite as flexible and can operate only on words and longwords. There are eight of these and they are shown as an A on the listing with a number following to signify which register is being used. A7 registers though are used as the stack pointers by the processor. I say registers because there are two, one for user mode stack pointer and one for the supervisor mode stack pointer.

When the 68000 in user mode reaches opcodes it does not understand it enters into supervisor mode and then works on that command. If it still does not understand however it will stop the user program. This is how sprites are controlled by the ST, you just load the address and data registers with the information and then give the correct opcode so as to confuse the 68000 in user mode and then it works on the information in supervisor mode. Very clever stuff, eh? There are many other special codes available to the user, hundreds of 'em but we will use two, one for drawing the sprite and another for clearing it.

Drawing the sprite is done with the $A00D opcode and it is necessary first to load register D0 with the horizontal position of the sprite and D1 with the vertical position, also you must load the register A0 with the start address of the sprite definition block and A2 with the address for where the rubbed out area of screen will be stored so as to be able to redraw it back onto the screen when you move the sprite. Then you use the $A00D opcode to confuse user mode and, hey presto, your sprite that was defined is displayed. Easy!

by Chris Darkes

Erasing the sprite is done with the $A00C opcode, it is necessary first to load register A2 with the address holding the rubbed out area of the screen, even easier! The amount of RAM required for each erased sprite is 74 bytes for mono, 138 bytes for medium resolution and 266 for low resolution.

The sprite definition block starts with five words (2 x byte) containing information about the sprite to be drawn and then follows 32 words defining the shape e.g.

1st word	horizontal offset to D0 advised position
2nd word	vertical offset to D1 advised position
3rd word	? I am not sure, try and see
4th word	background colour of the sprite
5th word	foreground colour of the sprite
6th word	background bit pattern for sprite's top line
7th word	foreground bit pattern for sprite's top line
8th word	background bit pattern for sprite's second line
9th word	foreground bit pattern for sprite's second line

The pattern continues now as far as you wish till the maximum of 32 words defining the sprite shape is reached. Each bit that is set will turn on the corresponding colour for that pixel, one word equals 16 bits giving a 16 bit pattern for each line of the sprite.

```
List of \DSPDEMOB.BAS

10    REM SPRITES demo for PAGE 6 magazine by Chris Darkes ***
100   DEF SEG=1
110   FOR A=462847 TO 462884:READ B :POKE A,B:NEXT A
120   FOR A=466943 TO 466983:READ B:POKE A,B:NEXT A
125   DEF SEG=0:VARRAY=1238:VARRAYP=1240
126   POKE VARRAY,7:POKE VARRAYP,4096:REM initialize VBL at address 462848
200   REM ************MOVE CAR FROM BASIC COMMANDS****************
210   SPHPOS=473344:SPVPOS=473346
220   POKE SPVPOS,100:REM move sprite to the middle of the screen
230   FOR Z=1 TO 10:FOR A=0 TO 319:POKE SPHPOS,A:SOUND 0,0,0,0,9:NEXT A:NEXT I
299   REM ********************AUTO ROUTINE DATA********************
300   DATA 36,124
310   REM background data place follows
311   DATA 0,7,48,0
320   DATA 160,12,48,57
330   REM store place for horizontal position of sprite follows
331   DATA 0,7,57,0
340   DATA 50,57
350   REM store place for vertical position of sprite follows
351   DATA 0,7,57,2
360   DATA 32,124
370   REM sprite data place follows
371   DATA 0,7,32,0
380   DATA 36,124
390   REM background data place follows
391   DATA 0,7,48,0
400   DATA 160,13,70,117,0,0
499   REM ****************SPRITE DEFINITION BLOCK*****************
500   REM horizontal offset of sprite follows
501   DATA 0,0
510   REM vertical offset of sprite follows
511   DATA 0,0
520   REM format flag follows
521   DATA 0,0
530   REM background colour of sprite follows
531   DATA 0,15
540   REM foreground colour of sprite
541   DATA 0,2
550   REM background pattern of first line of sprite follows
551   DATA 227,0
560   REM foreground pattern of first line of sprite follows
561   DATA 0,0
570   REM background pattern of second line of sprite follows
571   DATA 227,0
580   REM foreground pattern of second line of sprite follows
581   DATA 28,128
590   REM background pattern of third line of sprite follows
591   DATA 0,0
600   REM foreground pattern of third line of sprite follows
601   DATA 255,128
610   REM and so on with the rest of the shape for the sprite
620   DATA 16,0,255,128,0,0,255,128,227,0,28,128,227,0,0,0,0,0,0
```

BASIC listing

Each line has a background colour pattern of 16 bits and a foreground colour pattern of 16 bits requiring two words per pattern line with, naturally, the foreground taking priority.

Speed of draw and erase is fairly rapid considering each sprite is drawn pixel by pixel into the screen RAM area. I found more than four hundred sprites per second could be handled, but being realistic and tying them into vertical blank, BASIC and Assembler program ran 30% slower when controlling four sprites intelligently. Remember that when being controlled by VBL they are being addressed every 1/50th of a second. To put this 30% slower into perspective, the ST Basic would still be running faster than the Atari 800 and Spectrum basic's.

Now to the listings. The BASIC and Assembler listings are the same except for the routine at address $70000 which is non existant in the BASIC listing. Apart from that you can compare notes from both listings. I have included many comments (REM statements) to enable you to fully understand and have tried to keep the commands simple.

The routines are loaded into the ST's memory in front of the normal screen memory which resides at $78000 to $7FFFF and I hope this is the safest place for linking to the Basic program. Anyway I had no trouble and it was thoroughly tested. I do foresee a possible problem though in line 126 in BASIC and in Assembler line 28, this is where the address for the auto routine is put into the vector array which on my ST is the correct address, if you have problems check this. At address $456 (1110 decimal) is a longword that points to the vector array, so get this and then look at the longword addresses of the vector array. You are looking for an empty address (a longword that equals 0). When you find one, that is the place to poke or move the auto routine's address into.

If you do decide to handle multiple sprites, do not forget to erase the first drawn sprite last and erase the last drawn sprite first otherwise when the sprites merge a mess will result, you can see this if you move the mouse cursor into the drawn sprite (the mouse cursor is a sprite). ●

```
;DRAW SPRITE demo program for PAGE 6 magazine
SPHPOS=$73900 ;Address for position of sprite accross screen
SPVPOS=$73902 ;Address for position of sprite down screen
;*********************************************************************
ORG $72000 ;Address to hold sprite image data
LOAD $72000
DC.W 0,0,0,$F,$2 ;X offset,Y offset,Format flag,Bkgrnd color,Frgrnd color
;32 word pattern now
DC.W $E300,0,$E300,$1C00 ;Background pattern,Fore.pattern,B.pattern,.Etc
DC.W 0,$FF80,$1000,$FF80 ;Etc,etc
DC.W 0,$FF80,$E300
DC.W $1C80,$E300,0,0,0,0
;*********************************************************************
ORG $70000 ;Address to hold machine code program
LOAD $70000
MOVE.B #0,D4
MOVE.W D4,SPHPOS ;reset horizontal position of sprite
MOVE.W D4,SPVPOS ;reset vertical position of sprite
MOVE.W #0,D0 ;Draw image first before going to auto routine
MOVE.W #100,D1 ;Y position of image down screen
MOVE.L #$72000,A0 ;sprite data place
MOVE.L #$73000,A2 ;Background data place
DC.W $A00D ;Opcode trap for Enable Sprite
MOVE.L #VBLQAPLUS,-(SP);To be done in supervisor mode
MOVE.W #38,-(SP)
TRAP #14
ADDQ.L #6,SP
VBLQAPLUS:MOVE.L #$71000,$4D2
;****MOVE CAR SPRITE ACCROSS SCREEN X CYCLES THEN STOP****
MOVE.B #0,D6
CYCLES:ADD.B #1,D6
CMP.B #10,D6 ;Amount of times for car to go accross screen
BEQ BP
MOVE.W #0,D5 ;Reset SPHPOS
LOOP:MOVE.W D5,SPHPOS
ADD.W #1,D5
DELAY:ADD.W #1,D4 ;*** Speed of car delay loop ***
CMP:W #$3F9,D4 ;Reduce the #number to speed up car
BNE DELAY
MOVE.W #0,D4
CMP.W #319,D5
BNE LOOP
BRA CYCLES
BP:;Breakpoint flag
;*********************************************************************
ORG $71000 ;Address to hold sprite rub out and draw auto routine
LOAD $71000
MOVE.L #$73000,A2
DC.W $A00C ;Opcode trap for clear sprite
MOVE.W SPHPOS,D0
MOVE.W SPVPOS,D1
MOVE.L #$72000,A0 ;sprite place
MOVE.L #$73000,A2
DC.W $A00D
RTS
```

K-SEKA listing

K-COMM

Kuma Computers Ltd.

£39.95

If you are looking for a straightforward easy to use a comms package for your ST, K-COMM could well provide the answer. If all the settings of bits and parity and handshaking confuse you don't worry as everything is taken care of with fully mouse selectable menus showing all the options available. In using GEM fully Kuma have provided one of the easiest to use communications programs so far.

The only file transfer protocols available are straight ASCII and XMODEM and, whilst baud rates can be chosen from 300 to 9600, split rates are not available. Function keys can be defined as can the keyboard layout. Parameters set for different systems you wish to access can be saved to disk and recalled as required as can printer configurations which, as with all of the K-series, can be easily user defined.



K-COMM is not a highly sophisticated package like PC InterComm but it provides the basic communications software that most people will need in the easiest to use fashion. Communications is a complex business (I think so!) so the easier to use the software is the better. K-COMM scores quite highly here over such 'all embracing' packages as PC InterComm. ●

ST ST ST ST ST ST

PRO-FORTRAN 77

Prospero Software

reviewed by Matthew Jones

FORTRAN was one of the first high level languages. It was designed for engineers and scientists to do fast mathematics (hence the name FORmula TRANslation) in a machine independent way. A Fortran compiler has been written for just about every mainframe computer, and due to its relative portability and easy access, a vast amount of scientific and other software has been written using it.

An example of the sort of software that has been written in Fortran is a program called COPE, a decision support system, which has been under development for over 7 years at the University of Bath (where I happen to work). Fortran was all that was available when the program was started, and now, even with more powerful languages around, re-writing 16,000 lines of code is hard to justify, so an available Fortran compiler is necessary if it is to be used on a micro. Prospero Software's Pro-Fortran 77 aims to fill this role on the Atari ST.

THE COMPILER

Pro-Fortran is a full implementation of the ANSI Fortran 77 standard running on the ST under GEMDOS. In operation the compiler is quite simple, and there are several different ways it can be used, but generally you specify the source filename and are then prompted with each of the various options the compiler has. These include echo of error messages to a disk file, range checks on subscripts and/or assignments, a line number track for debugging, a listing and map facility, and INTEGER means INTEGER*2 switch, and a useful facility to report undeclared variables (marvellous for spotting typing mistakes). You can accept the defaults or change them (permanently if you want), and then the compilation starts.

Each program module is named as it compiles, and errors are displayed on screen, complete with the text of the erroneous line and an indication of the faulty character. This is where I discovered how tight to the specification Pro-Fortran sticks. I compiled several of the COPE source files and discovered that Pro-Fortran is very pernickety about getting statements correct, whereas the Fortran on the IBM PC where the code came from accepts our slight sloppiness. The particular examples are: that Fortran labels (names of subroutines and variables) are only significant to six letters, and our code which has several seven and eight letter names was thrown out; and cheating with character arrays by comparing them with integers (i.e. IF(D(2).EQ.32)) is also illegal and must be done properly (IF(D(2).EQ.CHAR(32)). In general such adherance to the specification is a good thing, as it encourages good programming practice, something the language generally doesn't do (it is not a structured language).

Speed-wise the compiler seems quite acceptable in comparison with other compilers, and it produces .BIN binary files suitable for input to the GST linker which seems to be becoming the standard linker for the U.K. (and elsewhere I hope). The various .BIN files of your program are linked in with the Fortran library interface, and can then be run.

THE LIBRARIES

The libraries provide all the standard functions, and a few machine specific routines. What really makes the library stand out is the way it is used. It really is rather odd, and is the first time I have ever seen or heard of anything like it. Your code is linked with interface code which looks for, then uses, a section of code called PRL (Prospero Run-time Library) which is loaded completely separately. Most other systems include the library (or required parts of the library) in with the rest of the program so there is only one load. A few systems I have seen load the library at run-time from a separate file, but a completely separate load is very unusual. If PRL is not resident, your code will not run.

The reason for this behaviour is that your program can automatically run others, and each child program uses the same PRL code, thus cutting the memory requirement of each program. In principle a sound idea, but such spawning is not standard Fortran, and this system is added hassle to the end user. Prospero do suggest putting PRL in the AUTO folder, but unless you are a regular Fortran user, this seems to be inconvenient as it may have side effects in other programs.

THE MANUAL

The half-inch thick manual that accompanies the compiler comes in a very smart blue ring binder and box. It is written in three parts, a general overview, complete language definition, and how to use the various parts of the compiler. The language definition will provide a useful reference to Fortran in general, but it also covers the additional library functions such as GETCOM (get command line), RANDOM, IPEEK, POKE, DATE, TIME, EXECPG (the run-another-program facility), a TOS call (SYS), and a complete set of GEM AES and VDI calls. It is this latter facility that I think gives Prospero Fortran a great bonus. Until now, no Fortran has been designed with a GEM interface in mind, and this will prove very tempting to authors. What does put a damper on this though is that Prospero have no plans to include GEM libraries in their IBM PC version of Fortran. This means that applications cannot be ported between the two easily which, if possible, would double the market and reduce the risk for developers.

CONCLUSION

Pro-Fortran 77 is a good, useable Fortran compiler, and apart from my reservations about PRL, is quite suitable for developing serious applications with. Those who want a Fortran on their ST will be pleased, but what makes it for me is the GEM interface.

Finally, the price (approximately 130 pounds) is reasonable for a Fortran compiler, but I hope the level of support matches. ●

Vip PROFESSIONAL

from disaster to triumph

One of the first things to catch my eye for the ST was VIP. Several demos were released which made VIP look to be the ultimate spreadsheet program for any of us whose previous experience had been with 8-bit machines only. I couldn't wait and VIP Professional duly became my first software purchase for the ST. Boy was I wrong! That first release was so bug ridden as to be unusable and with TOS in RAM gave you a spreadsheet about the size of a sheet of A4! A review began to formulate in my mind along the lines of 'VIP - the ultimate con' but then Silica Distribution came to the rescue with the 'official' U.K. version of VIP Professional. I booted it up, it worked, and now I am completely hooked. From that dreadful beginning came one of the most used programs on my ST.

It is not possible to go into detail in a review of exactly what a spreadsheet of this nature can do, much of that is left to the imagination of the user. Suffice it to say that if you can think of an application within the capabilities of the spreadsheet format then VIP should be able to do it for you.

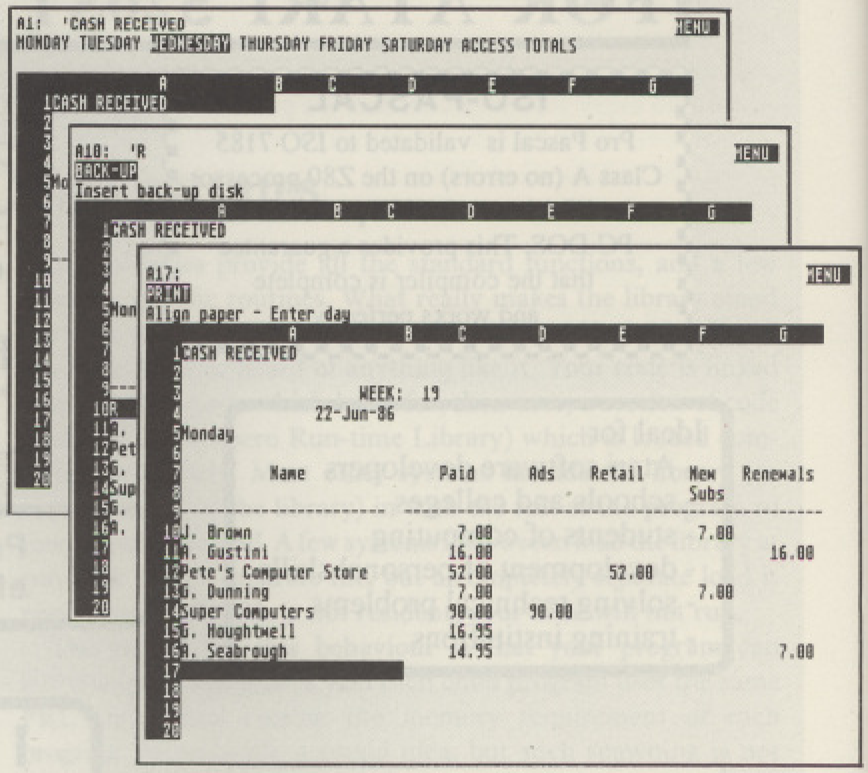
Reviews elsewhere have made much of the slow screen refresh on the ST but proper use of the editing keys can overcome this to a large degree. The movement around the sheet is comprehensive and it is worth spending some time familiarising yourself with all the commands available. Almost any part of the worksheet can be reached very quickly especially if use is made of the superb Range Name feature where any cell or range of cells can be given a name and then accessed immediately via a function key. This Range Name feature can also be used when printing out parts of the worksheet.

One of the problems on many spreadsheets is keeping track of rows and columns when working on a large template. VIP is a delight to use in this respect as columns or rows, or both, can be 'frozen' as titles and will then remain on screen at all times scrolling in conjunction with the remainder of the worksheet. Alternatively the screen can be split into two windows at any given point and the windows can be synchronised or can be left 'fixed'.

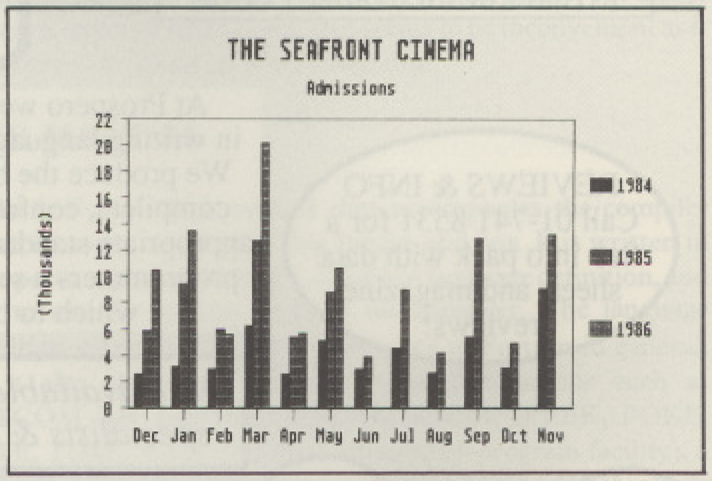
Copying formulas or cells is very easy with automatic re-evaluation of cell references as desired. If for example you need to total 20 columns (or 100!) then simply define the formula in the first column and copy that in one short process to the remaining columns. All cell references are automatically adjusted.

Another area where many spreadsheets become cumbersome to use is in placing cell references in formulas. You often need to check each part of the worksheet and make notes of the relevant cells before entering the formula. VIP allows you to begin defining the formula and then use the full cursor movement features to find any cell on the worksheet. Hitting Return will then add that cell to the formula and then allow you to go and find more cells. This works perfectly well with ranges also. In fact in all respects VIP is very easy to use once you have remembered the keystrokes but if you get stuck a help file can be called up at any point and of course there is always the 250 page manual!

One area which I left for some time, feeling it was too involved, was the macro facility but with a little practice macros will change VIP from a static piece of software to a superb working tool designed specifically for your needs. If you purchase VIP, learn how to use the macros, you will not regret it.



User defined menus



Graphing capabilities

There are many, many, more features to VIP which it will not be possible to cover in this review so I will attempt to give an idea of what can be achieved by giving you illustrations of an actual template in use involving a fair number of macros. I have set up templates which handle self employed accounts, VAT returns, household accounts, mortgage analysis and others but the one used for illustration is for analysis of daily cash takings. This is set up as a seperate worksheet for each working week with columns headed by each of the items, in categories, that customers can purchase. There are 22 columns with 40 rows for each day of the week before everything is totalled. A simple macro allows additional rows to be inserted should the space become full and any recalculations of cell references are taken care of automatically. Payments are simply entered as received and broken down into categories. A checksum column is used at the end to ensure that entries balance.

reviewed by Les Ellingham

When a new week is started an 'auto execute' macro checks to see if a week number has been entered on the worksheet just loaded. If not it asks for a week number and the date. All dates for the remaining days of the week are calculated automatically from this. If the worksheet has already been used during the current week, this stage is skipped and the program goes on to present a user defined menu allowing the choice of moving to the part of the spreadsheet for the appropriate day. By using the Range Name feature a single macro keystroke moves the cursor to the appropriate part of the worksheet, moves fives lines down, fixes the rows above the cursor as titles and waits for you to enter the day's payments.

Once the day's receipts have been entered another single keystroke will calculate the entire spreadsheet, updating the totals for the week. If the checksums do not agree for any row a warning is given and you are returned to the worksheet to correct the error. Assuming all is well a 'Print' menu is displayed and hitting return will print out a particular day. When printing is finished further menus ensure that you Save the worksheet and take a backup before quitting or automatically loading another worksheet. All of this is accomplished by user defined macros and makes VIP easy to use even for an operator who is not used to computers.

Defining the macros themselves does require a little understanding of computer programming but will be simple for anyone who can understand even limited BASIC. Macros are extremely powerful and I keep adding little refinements almost week by week to ensure that the program does exactly what I want it to do.

I haven't touched on the graphing capabilities or data functions but any of the information entered can be graphed in several different ways quite easily and graphs once defined can be named, saved and recalled at will.

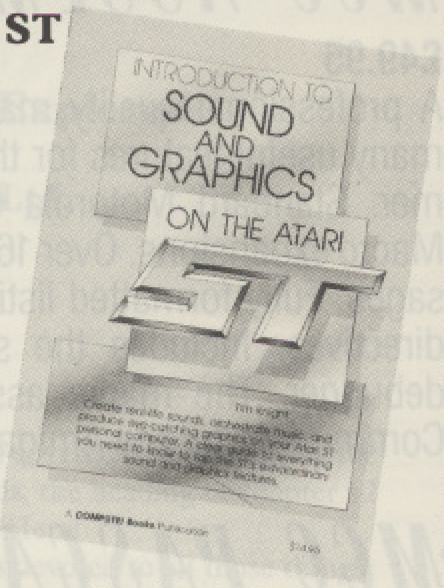
There is no doubt that VIP Professional is a very powerful package. It is easy, fun and exciting to use and can do almost anything you can think of. It is expensive at £194.35 but is a fraction of the price your business colleagues will pay for their 1-2-3's and the like and it will do just the same. One initial disappointment, by the way, was that the version I have is a 'text' version in that it does not use GEM. I was upset at this at first but having found the program so easy to use I cannot see how a GEM version will improve it. Indeed I feel that the opposite will be true and I will not bother to get the GEM upgrade which is promised for June release. Funny thing to say, you might think but there are some applications where the GEM environment adds nothing to the ease of use of the program.

Finally a couple of criticisms. There are still one or two minor bugs in the program so ensure that you have back-ups before making any major changes to the structure of a template. Secondly, VIP really gobbles up memory in an alarming fashion, especially when using a lot of formulas. I have a template set up on K-SREAD which uses lots of formulas and takes up 113k. With VIP you get an 'out of memory' message on this template when only half has been entered, even on a 1Mb 1040ST! ●

Introduction to SOUND AND GRAPHICS ON THE ATART ST

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A number of books are now arriving for the ST but most are still very much on a beginners or introductory level. This one clearly states that it is 'an introduction' and treated as such is a worthwhile investment. The book is clearly aimed at those owners who want to write programs for their machines but who have not yet made the decision to learn one of the more advanced programming languages. It therefore concentrates on the two languages supplied with the ST, BASIC and LOGO, with a smattering of FORTH thrown in.

After a brief introduction about setting up the machine the first chapter introduces LOGO from the point of view of graphics and gives several basic examples of shape drawing and movement of the turtle. Only 25 pages are devoted to LOGO and, as can be expected, the coverage is fairly rudimentary. BASIC fares much better with the substantial portion of the book devoted to this language. There are many programming examples which are generally quite short and thus easily typed which will whet your appetite for more advanced techniques later. Again these are mainly concerned with producing shapes of various sorts but there is plenty to give you ideas of your own.

The chapter on Sound and Music is more interesting as, strangely, hardly anyone seems to have explored the sound capabilities of the ST. At least you will be able to start producing some music and sound effects with the information given here which generally has not been easily available elsewhere.

Much of the power of the ST is not accessible from BASIC but there are commands which can be used to access many of the routines built into the operating system and VDISYS is one such. A whole chapter is devoted to this command and, for someone who has programmed before, this is probably the most valuable chapter in the book giving a taste of just what is possible with the ST. The remainder of the book, including the chapter on Forth seems to be there for the sake of filling up the book but will provide interesting information to the first time user.

Overall very much an introductory book which users experienced with 8-bit Ataris might find somewhat dull but worthwhile for anyone who has those language disks and wants to do something on his ST. ●

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BOOKS



The ATARI ST Explored
by John Braga
Kuma Computers Ltd.
£8.95

All the well known publishers are working on or have released their first ST books but here we have a book published by a software company. Can it compete with the full time publishers? You bet it can, it is probably the best book yet published for the average user of the ST. Whilst it covers the usual introduction to the system, and BASIC and LOGO it is full of little snippets which others have failed to uncover and goes much further with good details about aspects of the Operating Systems and how to access them via 68000 machine code or C.

Even if you are already familiar with the GEM environment reading through the introductory chapters of this book will probably teach you one or two things you did not know such as how to change the names of the disk drive icons or properly install applications. Once you have read this section you should be quite familiar with GEM and will feel quite comfortable in progressing through the chapters dealing with the Operating System, VDI and BIOS etc. The section on BASIC is quite small but does not mess around and goes straight into VDISYS calls from BASIC and is therefore likely to be of much more interest to experienced BASIC programmers than other 'introductory' books. LOGO receives its usual mention before the book introduces 68000 machine code via the K-SEKA Assembler (published by guess who?) which, as far as I am aware, is the first time a book has covered this specifically for the ST. From here onwards, the heading of chapter 12 says it all - Hackers, Start Here!

Over half of the book is devoted to all those things that programmers want to know. Bits of code to show you how to access windows, menus and the like. This section begins with a list of memory addresses in low RAM and is followed by details of the BIOS interface with a list of all the normal BIOS commands and examples of how to use them in both C and Assembler. Next comes the TOS interface and the GEM interface and the 'Line A' interface. All these are treated in similar fashion with a full list of commands and Assembler routines for you to explore and put into your own programs. Finally comes four real problems or programming projects to show you how to put all this knowledge to good use.

The projects include how to alter the RAM based TOS, how to change the on-screen font, how to change the 'fixed' icon descriptions and how to patch in a directory printer. Work through these and you should be well on your way to building your own programs.

The book is rounded off with a discussion of accessing the outside world through the serial port which will help a lot of people and a round up of software which will inevitably become dated but is a good reference for the first time buyer.

In my opinion Kuma have come up with the best book so far published on the ST. It covers far more than many of the books so far published, which often have been just an extension of the manual, and is ideal for anyone who has some experience of computing but little knowledge of the ST. The only thing that lets the book down is lot of 'jokey' notes such as 'This is a diagram of a blank page' which tend to make anyone flicking through the book think that it is just another worthless tome whose author is struggling to fill the pages. Not so. A fine book published in Britain and priced at just £8.95. If you want to do more than just click that mouse on ready made programs you will find your money well spent.

reviewed by Les Ellingham

the software supplies company

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Smartsheet

by Ken Shiu

Much of the interest in the ST is in the business software available but it is quite possible to use the 8-bit machines for certain business applications. Spreadsheets are an example with Visicalc and Syncalc available. If you have not tried these on your machine Smartsheet may be the ideal introduction. If you have only a limited need for a spreadsheet, Smartsheet may well do all you want.

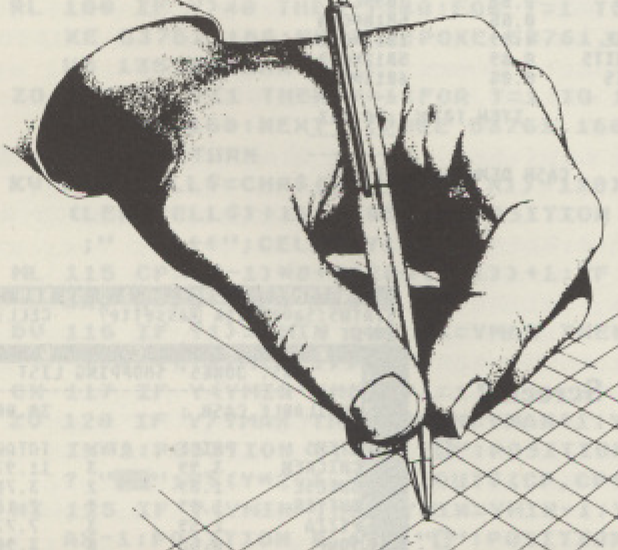
Smartsheet is a spreadsheet calculator which is extremely handy for financial forecasting, budgeting or any calculations that involve many variables. Due to its need for two buffers, Smartsheet will only work on a 32K cassette or 48K disk system as a minimum.

The on-screen worksheet is divided up into cells or grid coordinates, arranged 15 columns across (A-O) and 40 rows down. Examples of cell references are A1, O15, F32, etc. Due to the cell format (total of 600 cells) it is only possible to display a portion of the worksheet on the screen, so in order to view different areas of the worksheet, the screen acts as a scrolling window over the worksheet.

OPERATION

To attempt to explain how to operate a spreadsheet in a few pages is no easy task. Those already familiar with spreadsheets (e.g. VISICALC, SYNCALC), should feel at home since Smartsheet is basically styled after VISICALC. To newcomers, I hope the following will be enough to get you started.

When Smartsheet is run, the screen is divided into two sections. The upper blue screen is the input window, which displays different menus, input prompts, error messages and the current cell co-ordinate. Below, is the grey worksheet screen, the window to the rest of the sheet. The black inverse bar is the cursor and is controlled by the normal cursor control keys. Its initial position is cell A1.



SMARTSHEET first appeared in Inside Info, the newsletter of A.C.E. (N.S.W.), G.P.O. Box 4514, Sydney, N.S.W., Australia 2001

Smartsheet recognises three cell types: Labels, Values or Formulas. Since Smartsheet only involves itself with number calculations, labels are for the users' benefit, similar to REM's in BASIC. They are usually placed in the column left of a value, to identify it. e.g., SALES, COST, PROFIT, etc. Labels are exactly like the list of items on a shopping list. To enter a label, position the cursor and type in the label, if the label is too long, the cursor will automatically be forwarded to the next column.

Values are numbers you input for the worksheet calculations to function properly. Values may take any form - positive, negative, decimal, etc. The use of values is similar to the prices next to items on a shopping list. Values are input by typing numbers directly into the cell. When the cursor is moved away, the value is moved to the right to align the decimal places.

By pressing OPTION, formulas can by input into the current cell or answers to simple equations can be found. Note, values must be entered into the appropriate cells in a worksheet for a formula to function at all. Smartsheet gathers its input from cells nominated within a formula and displays the result after all calculations are complete. After pressing OPTION, 'Formula' appears on the status line and on the input line you are asked whether the first number in the formula is to be a cell location or a number. The power of formulas in Smartsheet, is the ability to access values from other cells, e.g. a formula may calculate a PROFIT figure, and therefore will access the values you have input for SALES and COST and will make the necessary subtraction.

Next the desired operation has to be input - addition, subtraction, multiplication, division or exponent (power of). Smartsheet is limited to one operation per formula. After entering the 2nd number as a cell or number the full equation will be seen on the sheet. If no cells have been accessed, the formulas will remain until they are calculated after pressing START.

A subset of the formula is the SUM function, which is accessed by typing a colon (:). The SUM function allows you to total values between one cell and another in a particular row or column. After typing a colon, the input line asks 'FROM CELL:?', here you should enter the cell where the totalling will begin, e.g. A1. Your input will be registered in the brackets in the status line when 'TO CELL' appears. Input the cell, where the totalling will end, e.g. A9. The input line will be cleared, and when you move the cursor off the formula cell, your From and To cells will be shown, e.g. :A1:A9.

Once you have finished structuring your worksheet, complete with labels, values and formulas, press START to calculate the worksheet. The message 'Calculating...' will appear while Smart-

continued overleaf

sheet is computing answers. Calculating time depends on the number of formulas within the worksheet. When Smartsheet has finished, the screen will temporarily clear and the final worksheet will be seen with all formulas replaced with the results.

HELP

Smartsheet also has an optional menu for aid while developing a worksheet. The menu is accessed by pressing SELECT. The menu 'G L E S P H' will appear on the status line. Press the corresponding key to obtain these functions.

G - Global Format: Selects how values are to be formatted when input. Choose from Dollar, Normal and Integer formatting. Dollar will automatically change your input value to dollar and cent format. Normal will leave your value untouched, while Integer will round your input to the next whole number.

L - Load Worksheet: Loads a previously saved worksheet from a disk or cassette. Press D or C to select Disk or Cassette respectively. If using cassette follow the same procedure as loading BASIC programs. If using disk, you may either:-

1. Press the bar to cycle through the Smartsheet workfiles on your disk and press RETURN to load the file displayed in the input window.
2. Input a filename directly on the input line and press RETURN to load it.

S - Save Worksheet: Saves current worksheet in memory to either disk or cassette. Press D or C to select Disk or Cassette to save on respectively. Smartsheet saves the whole sheet, so cassette owners make sure you have about 50 counter spaces on the cassette and be prepared to wait during saving and loading times! Disk owners have two choices (same procedure as Load function):-

1. Press the space bar to cycle through the Smartsheet files on your disk and press RETURN to update or save over the file displayed in the input window.
2. Input a filename (8 letter limit) directly on the input line and press RETURN to save it. Smartsheet uses '.SS' as an extender on its saved worksheets to identify them.

E - Erase Worksheet: Clears the current worksheet from memory. The program will re-ask whether you wish to erase the current worksheet in memory. Type Y to erase, or any other key to return to the worksheet. If you type Y then the screen will temporarily clear and a clean worksheet will appear.

P - Print Worksheet: Prints the current worksheet to a printer. Make sure your printer is ON LINE!! First you will be asked to input the cell at the lower right corner of your worksheet (in order to define the bottom and rightmost column). After entering the cell co-ordinate, you may imbed printer control codes at the beginning of each row in the worksheet. Type Y to imbed control codes e.g. double width for headings. If you elect not to use printer codes, press RETURN to begin printing. If you type Y for printer codes input the row number to imbed the code. The program will send control code before printing the row. Next, type the code in and follow the same procedure to input more codes. When you have finished press RETURN to print the worksheet.

H - Home Cursor: Returns the cursor to cell A1. When you are moving around the far extremes of the worksheet it is handy to use this function instead of repeatedly using the cursor keys.

? - Help Screen: Calling up this screen lists all the main keys and functions of Smartsheet.

That about wraps up the features of Smartsheet. If you prefer to have the cursor move without having to use the CONTROL and arrow keys simultaneously, just change the value equal to K in the lines 65,70,75 and 80 to 61,45,43 and 42 respectively.

EXAMPLE WORKSHEET

An actual example would better explain the basics behind a worksheet or 'template', as shown in the two sample screens. Screen 1 shows a template in its raw state with all formulas being uncalculated. All headings and item names are examples of labels. Any character including numbers may be made into a label by typing an apostrophe before entering the label, e.g. the line of minus signs beneath the heading.

The prices of the items are all values and have been Dollar formatted. The format has been changed to 'Normal' mid-way to prevent quantity values being shown in dollar and cent format.

In the D column, formulas are present. In cell D6, the value of cell B6 (price of chicken) will be multiplied by cell C6 (quantity of chicken). The result of this formula will be shown after calculation. The same applies to cell D18, where the item total (D15) is subtracted from the available cash (D3).

Cell D15 (item total) uses the SUM function. Upon calculation, Smartsheet will add all values from cell D6 to D13. Smartsheet calculates all formulas and sums from left to right, top to bottom on the worksheet.

When START is pressed, Smartsheet will pause to calculate and the result will appear as in Screen 2, where all formulas in the D column have been evaluated and replaced by a number. From here the user may experiment with different cash, price or quantity values to view the final outcome on Mrs Jones' purse. As can be seen in Screen 2, Mrs Jones will have trouble paying the bill with only thirty dollars.

Hopefully, I have made the versatility and applications of the spreadsheet more appreciable. The spreadsheet is by far the greatest tool for financial planning. It can definitely save considerable time and effort. Smartsheet is by no means as powerful as commercial spreadsheets but it does help to fill the business software gap that Atàri owners have been complaining about for some time. Maybe now you can justify all that money spent on computing!

```
- SMARTSHEET - Version 1.0 by Ken Shiu
STATUS:Menu: G L S E P H ?     CELL:A1
INPUT :
        A         B        C        D
 1        MRS. JONES' SHOPPING LIST
 2------------------------------------
 3AVAILABLE CASH :               35.55
 4
 5ITEMS        PRICE    QTY.    TOTAL
 6CHICKEN       3.99          3B6*C6
 7CHEESE        1.89          2B7*C7
 8BUTTER        1.09          2B8*C8
 9PIZZA         2.59          3B9*C9
10SOUP          0.65          6B10*C10
11COFFEE        4.99          1B11*C11
12BISCUITS      0.89          5B12*C12
13DRINKS        0.85          4B13*C13
14                             --------
15             ITEM TOTAL :D6:D13
16                             --------
17                             --------
18         CASH REMAINING D3-D15
19                             --------
20
```

Screen 1

```
- SMARTSHEET - Version 1.0 by Ken Shiu
STATUS:Save:Disk Cassette?     CELL:D18
INPUT :
        A         B        C        D
 1        MRS. JONES' SHOPPING LIST
 2------------------------------------
 3AVAILABLE CASH :               30.00
 4
 5ITEMS        PRICE    QTY.    TOTAL
 6CHICKEN       3.99       3    11.97
 7CHEESE        1.89       2     3.78
 8BUTTER        1.09       2     2.18
 9PIZZA         2.59       3     7.77
10SOUP          0.65       6     3.90
11COFFEE        4.99       1     4.99
12BISCUITS      0.89       5     4.45
13DRINKS        0.85       4     3.40
14                             --------
15             ITEM TOTAL       42.44
16                             --------
17                             --------
18         CASH REMAINING      -12.44
19                             --------
20
```

Screen 2

```
CS 1 REM ####################################
YX 2 REM #      SMARTSHEET VERSION 1.1      #
SJ 3 REM #           by Ken Shiu            #
NC 4 REM #    First published by Atari      #
OI 5 REM # Computer Enthusiasts (N.S.W)#
SH 6 REM # ---------------------------- #
XE 7 REM #  PAGE 6 MAGAZINE - ENGLAND  #
CZ 8 REM ####################################
NO 9 REM
LM 10 DIM OUT$(4800),IN$(4800),S$(600),DL
   I$(20),V$(80),H$(15),H(4),CELL$(3),C$(
   8),A$(11),FI$(14),DI$(20),PR$(120)
RV 15 GRAPHICS 0:POKE 559,0:OPEN #2,4,0,"
   K:":POKE 752,1:POKE 710,127:POKE 709,0
   :POKE 712,56:POKE 82,0
YV 20 DL=PEEK(560)+PEEK(561)*256:POKE DL+
   7,130:DLI$="H◥H)♥▙ ▄◣T▁▗P ▝Ph▩he":A=AD
   R(DLI$):DIM CL$(8)
OU 25 B=INT(A/256):C=A-B*256:POKE 512,C:P
   OKE 513,B:POKE 54286,192:GOSUB 2000
ZJ 30 ? "↰ - SMARTSHEET - Version 1.1 by
   Ken Shiu  STATUS:";:POKE 85,31:? "CELL
   :";CELL$
WX 35 ? " INPUT :":? "██████████████████
   ██████████████████"
EH 40 FOR T=Y TO Y+36 STEP 2:? "█";V$(T,
   T+1):NEXT T:? "█";V$(T,T+1);:POSITION
    4,4:? C$
CB 45 FOR T=1 TO 4:POSITION H(T),3:? H$(T
   ,T):NEXT T:POKE 764,255:POKE 559,34
XO 46 IF FL THEN RETURN
GF 50 TRAP 50:POKE 53774,64:POKE 16,64:IF
    PEEK(764)<>255 THEN 60
WQ 54 IF PEEK(53279)=5 THEN POKE 53760,10
   0:GOSUB 960:GOSUB 500
NP 56 IF PEEK(53279)=6 THEN POKE 53760,50
   :GOSUB 960:GOSUB 1200
AS 57 IF PEEK(53279)=3 THEN POKE 53760,15
   0:GOSUB 960:GOSUB 1000
TM 58 GOTO 50
IK 60 GET #2,K
FX 65 IF K=29 THEN GOSUB 200:Y=Y+1:GOSUB
    100
HM 70 IF K=28 THEN GOSUB 200:Y=Y-1:GOSUB
    100
KR 75 IF K=30 THEN GOSUB 200:X=X-1:GOSUB
    150
IK 80 IF K=31 THEN GOSUB 200:X=X+1:GOSUB
    150
NE 85 IF (K>47 AND K<58) OR K=45 OR K=43
    THEN GOSUB 900
LP 90 IF (K>64 AND K<123) OR K=34 THEN GO
   SUB 220
EJ 92 IF K=58 THEN GOSUB 800
MB 95 POKE 764,255:POKE 702,64:GOTO 50
RL 100 IF Y>40 THEN Y=40:FOR T=1 TO 10:PO
   KE 53761,168:NEXT T:POKE 53761,160:GOS
   UB 135:RETURN
ZO 105 IF Y<1 THEN Y=1:FOR T=1 TO 10:POKE
    53761,168:NEXT T:POKE 53761,160:GOSUB
    135:RETURN
KV 110 CELL$=CHR$(ASC(H$(X,X))-128):CELL$
   (LEN(CELL$)+1)=STR$(Y):POSITION 36,1:?
    ;"   ←←←";CELL$:Y1=Y
ML 115 CP=(X-1)*8+(120*(Y-1))+1:IF Y1>20
   AND K=29 THEN Y1=20
DV 116 IF Y1>=YMIN AND Y<=YMAX THEN Y1=20
   -(20-(Y-(YMIN-1)))
CX 117 IF Y<YMIN THEN Y1=1
ZV 120 IF Y>YMAX THEN YMAX=YMAX+1:YMIN=YM
   IN+1:POSITION 0,4:? "▯":POSITION 0,23:
   ? "█";V$(Y*2-1,Y*2);OUT$(CP,CP+31);
NI 125 IF Y<YMIN THEN YMIN=YMIN-1:YMAX=YM
   AX-1:POSITION 0,4:? "▯":POSITION 0,4:?
    "█";V$(Y*2-1,Y*2);OUT$(CP,CP+31);
AP 135 POSITION H(X1)-3,Y1+3:FOR T=CP TO
   CP+7:C$(T-CP+1,T-CP+1)=CHR$(ASC(OUT$(T
   ,T))+128):NEXT T
HW 140 ? C$;:POSITION 8,1:T=15*(Y-1)+X:A$
   =S$(T,T):IF A$="1" THEN ? "Label:";IN$
   (CP,CP+7)
LB 144 IF A$="2" THEN ? "Value:";IN$(CP,C
   P+7)
IA 145 IF A$=" " THEN ? "
          "
DE 146 IF A$="3" THEN ? "Formula:";IN$(CP
   ,CP+7)
AD 148 RETURN
TN 150 IF X>15 THEN X=15:FOR T=1 TO 10:PO
   KE 53761,168:NEXT T:POKE 53761,160:GOS
   UB 135:RETURN
YZ 155 IF X<1 THEN X=1:FOR T=1 TO 10:POKE
    53761,168:NEXT T:POKE 53761,160:GOSUB
    135:RETURN
DW 160 CELL$=CHR$(ASC(H$(X,X))-128):CELL$
   (LEN(CELL$)+1)=STR$(Y):POSITION 36,1:?
    ;"   ←←←";CELL$:X1=X
PS 165 CP=(X-1)*8+(120*(Y-1))+1
LR 167 IF X1>=XMIN AND X1<=XMAX THEN X1=X
    -(XMIN-1):GOTO 190
AL 170 IF X1<XMIN THEN X1=1:XMIN=XMIN-1:X
   MAX=XMAX-1
XI 171 IF X1>XMAX THEN X1=4:XMAX=XMAX+1:X
   MIN=XMIN+1
MO 172 G=0:FOR T=XMAX-3 TO XMAX:G=G+1:POS
   ITION H(G),3:? H$(T,T):NEXT T:G=0
HI 173 G=0:TS=(XMIN-1)*8+(120*(YMIN-1))+1
   :FOR T=TS TO TS+2280 STEP 120:G=G+1
EG 174 POSITION 4,G+3:? OUT$(T,T+31);:NEX
   T T
AM 190 POSITION H(X1)-3,Y1+3:FOR T=CP TO
   CP+7:C$(T-CP+1,T-CP+1)=CHR$(ASC(OUT$(T
   ,T))+128):NEXT T
IM 192 ? C$;:POSITION 8,1:T=15*(Y-1)+X:A$
   =S$(T,T):IF A$="1" THEN ? "Label:";IN$
   (CP,CP+7)
LL 194 IF A$="2" THEN ? "Value:";IN$(CP,C
   P+7)
IN 196 IF A$=" " THEN ? "
          "
DR 197 IF A$="3" THEN ? "Formula:";IN$(CP
   ,CP+7)
AN 198 RETURN
FS 200 POSITION H(X1)-3,Y1+3:CP=(X-1)*8+(
   120*(Y-1))+1:? OUT$(CP,CP+7);:RETURN
VZ 205 POSITION 8,1:? "
          ":RETURN
TQ 210 POSITION 8,2:? "
          ":RETURN
KU 220 POSITION 8,1:? "Label":S$(15*(Y-1)
   +X,15*(Y-1)+X)="1":T=0:CP=(X-1)*8+(120
   *(Y-1))+1
LF 222 C$="████████":OUT$(CP,CP+7)=CL$:IN
   $(CP,CP+7)=CL$
GC 223 IF K=34 THEN T=-1:GOTO 235
IB 225 POSITION 8+T,2:? CHR$(K):OUT$(CP+T
   ,CP+T)=CHR$(K):C$(T+1,T+1)=CHR$(K+128)
VL 226 IN$(CP+T,CP+T)=CHR$(K)
HH 230 POSITION H(X1)-3,Y1+3:? C$;
TY 235 GET #2,K:IF K=155 THEN GOSUB 210:R
   ETURN
MZ 236 IF K>27 AND K<32 THEN GOSUB 210:PO
   P :GOTO 65
IH 238 T=T+1:IF T>7 AND K<>126 THEN 295
QA 240 IF K=126 AND T=8 THEN T=-1:C$="███
   █████":OUT$(CP,CP+7)="        ":IN$(CP
   ,CP+7)="        ":GOSUB 210:GOTO 230
NH 241 IF K=126 THEN T=T-1:IF T<0 THEN T=
   0
SL 242 IF K=126 THEN OUT$(CP+T,CP+T)=" ":
   C$(T+1,T+1)="█":IN$(CP+T,CP+T)=" ":POS
   ITION 8+T,2:? " ":T=T-1:GOTO 230
ZZ 245 IF (K<32 OR K>122) THEN 235
PF 250 GOTO 225
ZR 260 POSITION 8,1:? "Global:Norm Int Do
   llar";
HT 265 GET #2,K
IY 270 IF K=27 THEN GOSUB 205:RETURN
VV 275 IF K=78 THEN GL=0:GOSUB 205:RETURN
UA 280 IF K=73 THEN GL=1:GOSUB 205:RETURN
WU 282 IF K=68 THEN GL=2:GOSUB 205:RETURN
OD 285 ? "▯":GOTO 265
```

```
JA 290 FOR T=1 TO 200:NEXT T:RETURN
AG 295 GOSUB 210:POP :G=K:K=31:GOSUB 200:X=X+1:GOSUB 150:K=G:POP :GOTO 65
IT 300 ? "Disk Cassette";
HI 305 GET #2,K
QB 310 IF K=27 THEN GOSUB 205:POP :GOTO 50
YE 315 IF K=67 THEN FI$="C:":GOSUB 205:RETURN
UB 320 IF K<>68 THEN ? "◘";:GOTO 305
IK 321 POSITION 13,1:? "Input Filename"
QI 322 GET #2,K:IF K=32 THEN 340
TX 325 IF K<65 OR K>90 THEN ? "◘";:GOTO 322
YV 327 T=1:GOTO 335
LR 330 GET #2,K:IF K=126 THEN T=1:A$=CL$:POSITION 8,2:? A$:GOTO 322
LI 331 IF K=155 THEN 338
TS 332 IF (K<48 OR K>90) OR (K>58 AND K<65) THEN ? "◘";:GOTO 330
BL 335 POSITION 8+(T-1),2:? CHR$(K):A$(T,T)=CHR$(K):T=T+1:IF T>8 THEN T=8
OK 337 GOTO 330
JG 338 FOR T=1 TO LEN(A$):IF A$(T,T)=" " THEN G=LEN(A$):A$(T)="":T=G
RJ 339 NEXT T:FI$="D:":A$(LEN(A$)+1)=".SS":FI$(LEN(FI$)+1)=A$:GOSUB 205:GOSUB 210:CLOSE #1:RETURN
XI 340 TRAP 2100:OPEN #1,6,0,"D:*.SS":TRAP 390
BL 344 INPUT #1;DI$:POKE 54286,192:IF LEN(DI$)<17 THEN 390
ZQ 345 POSITION 8,2:? "FILE:";DI$(3,10)
XG 346 GET #2,K:IF K=155 THEN A$=DI$(3,10):GOTO 338
FY 347 IF K=27 THEN GOSUB 210:POP :RETURN
PW 350 IF K=32 THEN 344
RN 355 GOTO 346
HU 390 POSITION 8,2:? "◘NO MORE SMARTSHEET FILES":CLOSE #1:FOR T=1 TO 300:NEXT T
VX 395 GOSUB 210:GOSUB 205:TRAP 40000:POP :RETURN
NV 400 POSITION 8,1:? "Load:";:GOSUB 300
VZ 405 TRAP 2100:OPEN #1,4,128,FI$:TRAP 420:POSITION 9,1:? "Loading...";A$:T=7
YT 410 A=ADR(IN$):L=4800:GOSUB 570:OUT$=IN$
FZ 415 A=ADR(S$):L=600:GOSUB 570:CLOSE #G/16:POKE 54286,192
XC 420 POKE 559,0:GOSUB 205:TRAP 40000:GOSUB 2020:FL=1:GOSUB 30:FL=0:POKE 559,0
HH 425 G=0:TS=(XMIN-1)*8+(120*(YMIN-1))+1:FOR T=TS TO TS+2280 STEP 120:G=G+1
DP 430 POSITION 4,G+3:? OUT$(T,T+31);:NEXT T
EL 435 POSITION 4,4:FOR T=TS TO TS+7:C$(T-TS+1,T-TS+1)=CHR$(ASC(OUT$(T,T))+128):NEXT T:? C$;:POKE 559,34:RETURN
BN 450 POSITION 8,1:? "Save:";:GOSUB 300
WD 452 TRAP 2100:OPEN #1,8,128,FI$:POSITION 9,1:? "Writing...";A$:T=11
UA 455 A=ADR(IN$):L=4800:GOSUB 570
GQ 458 A=ADR(S$):L=600:GOSUB 570:CLOSE #G/16:POKE 54286,192
TW 460 GOSUB 205:TRAP 40000:RETURN
KG 500 POSITION 8,1:? "Menu: G L S E P H ? ";
HK 505 GET #2,K
OL 510 IF K=71 THEN 260
NU 512 IF K=76 THEN 400
QU 514 IF K=83 THEN 450
TM 516 IF K=69 THEN 550
NS 518 IF K=80 THEN 600
IR 520 IF K=27 THEN GOSUB 205:RETURN
SS 522 IF K=72 THEN 580
LT 524 IF K=63 OR K=47 THEN 1500
LW 545 ? "◘":GOTO 505
UT 550 POSITION 8,1:? "Erase: Sure? (Y/N)";
HU 555 GET #2,K
PT 560 IF K=89 THEN POKE 559,0:GOSUB 2000:POP :GOTO 30
LH 565 GOSUB 205:RETURN
KA 570 G=16:CB=832+G:POKE CB+2,T:HI=INT(A/256):LO=A-HI*256:POKE CB+4,LO:POKE CB+5,HI
GB 572 HI=INT(L/256):LO=L-256*HI:POKE CB+8,LO:POKE CB+9,HI:I=USR(ADR("hhh◘LV◘"),G)
AE 575 RETURN
OA 580 GOTO 420
BT 600 POSITION 8,1:? "Print: Lower Corner?":POSITION 8,2:T=1:A$=""
GH 605 GET #2,K:IF K=27 THEN GOSUB 205:RETURN
FH 607 IF K<65 OR K>79 THEN ? "◘";:GOTO 605
AN 610 ? CHR$(K);:A$(T,T)=CHR$(K):T=T+1
CW 615 GET #2,K:IF K<48 OR K>57 AND K<>126 AND K<>155 THEN ? "◘";:GOTO 615
CO 620 IF T=2 AND K=48 THEN ? "◘";:GOTO 615
ED 625 IF K=126 THEN POSITION 8,2:? "    ":GOTO 600
FQ 630 IF K=155 AND T>1 THEN 645
YL 635 IF T=4 THEN ? "◘";:GOTO 615
OC 640 GOTO 610
KE 645 IF VAL(A$(2))>40 THEN ? "◘":GOSUB 210:GOTO 600
LG 650 DI$=A$:GOSUB 210:POSITION 8,1:? "Printer Codes? (Y/N)";
DZ 655 GET #2,K:IF K=78 THEN 705
ZE 660 IF K<>89 THEN ? "◘";:GOTO 650
OE 662 TRAP 662:GOSUB 210:POSITION 8,1:? "Enter Line Number     ":POSITION 8,2:INPUT L
YK 665 IF L<1 OR L>40 THEN ? "◘":GOTO 662
MC 667 A$=PR$(L*3-2,L*3):POSITION 14,1:? "Printer Codes"
AA 670 POSITION 8,2:? "Line ";L;" (ε";A$(1,1);"ε";A$(2,2);"ε";A$(3);"):   ◀◀◀";:T=1
LO 675 GET #2,K:IF K=155 THEN 690
JS 680 IF K=126 THEN 670
LS 682 IF T>3 THEN ? "◘":GOTO 675
YH 685 ? "ε";CHR$(K);:A$(T,T)=CHR$(K):T=T+1:GOTO 675
EY 690 PR$(L*3-2,L*3)=A$:GOSUB 210:POSITION 14,1:? "More Codes?(Y/N)";
HN 692 GET #2,K:IF K=89 THEN 662
GO 695 IF K<>78 THEN ? "◘";:GOTO 692
IW 700 TRAP 40000
VK 705 G=VAL(DI$(2)):A$=DI$(1,1):FOR T=1 TO 15:IF ASC(H$(T,T))-128=ASC(A$) THEN L=T*8:T=15
KO 710 NEXT T:GOSUB 210:GOSUB 205
SQ 720 TRAP 2100:OPEN #1,8,0,"P:":POSITION 8,1:? "Press RETURN to print"
TP 725 GET #2,K:IF K<>155 THEN GOSUB 210:GOSUB 205:RETURN
YE 730 L1=1:FOR T=1 TO G:A$=PR$(T*3-2,T*3)
XW 735 FOR Z=1 TO 3:IF A$(Z,Z)=" " THEN NEXT Z:GOTO 740
AN 736 ? #1;A$(Z,Z);:NEXT Z
NW 740 ? #1;OUT$(L1,L):L=L+120:L1=L1+120:NEXT T:CLOSE #1
OC 750 GOSUB 205:GOSUB 210:POKE 54286,192:RETURN
MH 800 S$(15*(Y-1)+X,15*(Y-1)+X)="3":T=0:CP=(X-1)*8+(120*(Y-1))+1:POSITION 8,1:? "Sum:(   -   )"
CU 805 POSITION 8,2:? "From Cell:   ◀◀◀";:INPUT A$
PE 810 IF LEN(A$)>3 OR LEN(A$)<2 THEN ? "◘";:GOTO 805
UE 812 IF ASC(A$(1,1))<65 OR ASC(A$(1,1))>79 THEN ? "↑◘";:GOTO 805
MT 814 IF VAL(A$(2))<1 OR VAL(A$(2))>40 THEN ? "◘";:GOTO 805
BA 818 POSITION 13,1:? A$
```

```
PD 820 POSITION 8,2:? "To Cell  :  ←←←";
   :INPUT DI$
QX 822 IF LEN(DI$)>3 OR LEN(DI$)<2 THEN ?
    "□";:GOTO 820
GS 824 IF ASC(DI$(1,1))<65 OR ASC(DI$(1,1
   ))>79 THEN ? "□";:GOTO 820
PO 826 IF VAL(DI$(2))<1 OR VAL(DI$(2))>40
    THEN ? "□";:GOTO 820
VK 827 IF A$(1,1)<>DI$(1,1) AND A$(2)<>DI
   $(2) THEN POSITION 8,2:? "□Cells must
   be linear!":GOSUB 290:GOSUB 210:GOTO 8
   00
QZ 828 POSITION 17,1:? DI$
PP 830 FI$=":":A$(LEN(A$)+1)=":":A$(LEN(A
   $)+1)=DI$:FI$(LEN(FI$)+1)=A$
HU 835 IF LEN(FI$)<8 THEN FI$(LEN(FI$)+1)
   ="  "
FF 840 OUT$(CP,CP+7)=FI$:IN$(CP,CP+7)=FI$
AH 850 GOSUB 210:GOSUB 205:RETURN
ZN 900 S$(15*(Y-1)+X,15*(Y-1)+X)="2":T=0:
   CP=(X-1)*8+(120*(Y-1))+1:POSITION 8,1:
   ? "Value:";IN$(CP,CP+7):C$="[redacted]"
IN 902 G=0:GOSUB 210:IN$(CP,CP+7)=CL$:OUT
   $(CP,CP+7)=CL$:IF K=126 THEN T=-1:GOTO
    910
TK 905 POSITION 8+T,2:? CHR$(K):C$(T+1,T+
   1)=CHR$(K+128):IN$(CP+T,CP+T)=CHR$(K):
   OUT$(CP+T,CP+T)=CHR$(K)
HK 910 POSITION H(X1)-3,Y1+3:? C$;
QB 920 GET #2,K:T=T+1:IF K=155 OR (K>27 A
   ND K<32) THEN GOSUB 210:GOTO 940
YE 922 IF T>7 THEN ? "□";:GOTO 920
GW 926 IF K=126 THEN 900
QR 928 IF (K>47 AND K<58) THEN 905
PI 930 IF K=46 AND G=1 THEN 935
WR 932 IF K=46 THEN G=1:GOTO 905
EK 935 ? "□";:GOTO 920
VJ 940 IF K=155 AND  NOT T THEN RETURN
HH 941 IF  NOT T THEN POP :GOTO 65
NK 942 TRAP 955:A=VAL(IN$(CP,CP+7)):IF GL
   =0 THEN A$=STR$(A):GOTO 948
DC 943 IF GL=2 THEN 945
AI 944 A=INT(A+0.5):A$=STR$(A):L=8-LEN(A$
   ):GOTO 948
KZ 945 IF A=INT(A) THEN A$=STR$(A):A$(LEN
   (A$)+1)=".00":GOTO 948
ER 946 IF INT(A*10)=A*10 THEN A$=STR$(A):
   A$(LEN(A$)+1)="0":GOTO 948
FS 947 A=INT(100*A+0.5)/100:A$=STR$(A)
FJ 948 L=8-LEN(A$):OUT$(CP,CP+L)=CL$:OUT$
   (CP+L,CP+7)=A$:IN$(CP,CP+7)=OUT$(CP,CP
   +7):TRAP 40000
BE 950 IF K=155 THEN RETURN
KB 952 POP :GOTO 65
XP 955 ? "□";:K=126:GOTO 900
PO 960 FOR L=1 TO 10:POKE 53761,175:NEXT
   L:POKE 53761,160:POKE 53760,200:RETURN
YW 1000 T=0:CP=(X-1)*8+(120*(Y-1))+1:POSI
   TION 8,1:? "Formula:";IN$(CP,CP+7):G=0
   :O=G:Z=1
PR 1004 POSITION 8,2:? "1st No.:Cell or N
   umber";:GET #2,K:IF K=27 THEN GOSUB 21
   0:GOSUB 205:RETURN
YX 1005 IN$(CP,CP+7)=CL$:IF K=67 THEN G=1
   :GOSUB 1020:GOTO 1030
HC 1006 IF K<>78 THEN ? "□";:GOTO 1004
DH 1007 GOSUB 1008:L=A:GOTO 1030
LE 1008 TRAP 1008:GOSUB 210:POSITION 8,2:
   ? "Enter No.:";:INPUT A$:IF LEN(A$)>4
   THEN ? "↑□";:GOTO 1008
DH 1009 POSITION 16+T,1:? A$:K=LEN(A$)-1:
   A=VAL(A$):IF G OR Z THEN IN$(CP+T,CP+T
   +K)=A$:T=T+K+1:RETURN
MT 1010 IF O=1 THEN A=A+L
OC 1011 IF O=2 THEN A=L-A
NC 1012 IF O=3 THEN A=A*L
QW 1013 IF O=4 THEN A=L/A
GT 1014 IF O=5 THEN A=INT((L^A)+0.5)
WS 1015 IN$(CP,CP+7)=CL$:IN$(CP,CP+7)=STR
   $(A):K=155:GOSUB 942:GOSUB 210:S$(15*(
   Y-1)+X,15*(Y-1)+X)="2":RETURN
CA 1020 GOSUB 210:POSITION 8,2:? "Enter C
   ell:";:INPUT A$:IF LEN(A$)<2 OR LEN(A$
   )>3 THEN 1025
EI 1021 IF ASC(A$(1,1))<65 OR ASC(A$(1,1)
   )>80 THEN 1025
RH 1022 IF VAL(A$(2))<1 OR VAL(A$(2))>40
   THEN 1025
RQ 1024 GOTO 1026
BY 1025 ? "↑□";:GOTO 1020
PE 1026 K=LEN(A$)-1:IN$(CP+T,CP+T+K)=A$:P
   OSITION 16+T,1:? A$:T=T+K+1:RETURN
XR 1030 S$(15*(Y-1)+X,15*(Y-1)+X)="3":GOS
   UB 210:POSITION 8,2:? "Operation:+ - *
    / ^";
OM 1031 GET #2,K:IF K=43 THEN O=1:A$="+":
   GOTO 1040
WW 1032 IF K=45 THEN O=2:A$="-":GOTO 1040
TI 1033 IF K=42 THEN O=3:A$="*":GOTO 1040
BU 1034 IF K=47 THEN O=4:A$="/":GOTO 1040
AH 1035 IF K=94 THEN O=5:A$="^":GOTO 1040
JU 1036 ? "□";:GOTO 1031
OL 1040 Z=0:IN$(CP+T,CP+T)=A$:POSITION 16
   +T,1:? A$:T=T+1:POSITION 8,2:? "2nd No
   .:Cell or Number";
DC 1042 GET #2,K:IF K=67 THEN GOSUB 1020:
   GOTO 1050
HI 1044 IF K=78 THEN GOSUB 1008:GOTO 1050
LI 1045 ? "□";:GOTO 1042
XO 1050 GOSUB 210:OUT$(CP,CP+7)=IN$(CP,CP
   +7):RETURN
XN 1200 POSITION 8,1:? "   Calculating...
   ";
DL 1202 FOR T=1 TO 600:IF S$(T,T)="3" THE
   N GOSUB 1210
EL 1205 NEXT T:GOTO 420
PR 1210 CP=(T-1)*8+1:A$=CL$:IF IN$(CP,CP)
   =":" THEN 1400
FE 1212 FOR A=CP TO CP+3:L=ASC(IN$(A,A)):
   IF L=42 OR L=43 OR L=45 OR L=47 OR L=9
   4 THEN Z=A-CP+1:A=CP+3:O=L:GOTO 1216
HU 1214 A$(A-CP+1,A-CP+1)=CHR$(L):NEXT A
ZU 1216 TRAP 40000:IF ASC(A$(1,1))>64 AND
    ASC(A$(1,1))<80 THEN 1220
NK 1218 A=VAL(A$):GOTO 1230
NZ 1220 TRAP 1225:F=ASC(A$(1,1))-64:G=VAL
   (A$(2)):H=(F-1)*8+(120*(G-1))+1:A=VAL(
   IN$(H,H+7)):GOTO 1230
YM 1225 TRAP 1226:A=VAL(OUT$(H,H+7)):GOTO
    1230
UE 1226 A=0
YL 1230 A$=CL$:A$=IN$(CP+Z,CP+7):IF ASC(A
   $(1,1))>64 AND ASC(A$(1,1))<80 THEN 12
   34
QD 1232 L=VAL(A$):GOTO 1240
WY 1234 TRAP 1235:F=ASC(A$(1,1))-64:G=VAL
   (A$(2)):H=(F-1)*8+(120*(G-1))+1:L=VAL(
   IN$(H,H+7)):GOTO 1240
HM 1235 TRAP 1236:L=VAL(OUT$(H,H+7)):GOTO
    1240
WV 1236 L=0
EB 1240 TRAP 40000:IF O=42 THEN A=A*L
MK 1242 IF O=43 THEN A=A+L
PI 1244 IF O=45 THEN A=A-L
SG 1246 IF O=47 THEN A=A/L
GV 1247 IF O=94 THEN A=INT((A^L)+0.5)
DC 1248 IF GL=0 THEN A$=STR$(A):GOTO 1270
EN 1250 IF GL=2 THEN 1260
ZV 1252 A=INT(A+0.5):A$=STR$(A):L=8-LEN(A
   $):GOTO 1270
YJ 1260 IF A=INT(A) THEN A$=STR$(A):A$(LE
   N(A$)+1)=".00":GOTO 1270
FA 1262 IF INT(A*10)=A*10 THEN A$=STR$(A)
   :A$(LEN(A$)+1)="0":GOTO 1270
CU 1264 A=INT(100*A+0.5)/100:A$=STR$(A)
OR 1270 L=8-LEN(A$):OUT$(CP,CP+L)=CL$:OUT
   $(CP+L,CP+7)=A$:RETURN
WP 1400 SUM=0:A$=IN$(CP+1,CP+3):H=3:IF A$
   (3,3)=":" THEN A$=IN$(CP+1,CP+2):H=2
LD 1402 A=ASC(A$(1,1))-64:L=VAL(A$(2))
IW 1404 A$=IN$(CP+2+H,CP+7):F=ASC(A$(1,1)
   )-64:G=VAL(A$(2))
```

Smartsheet continued

```
JE 1405 IF A=F THEN O=A-1:FOR Z=L TO G:TR
   AP 1416:H=O*8+(120*(Z-1))+1:V=VAL(IN$(
   H,H+7)):GOTO 1420
QO 1410 IF L=G THEN O=L:FOR Z=A-1 TO F:TR
   AP 1416:H=Z*8+(120*(O-1))+1:V=VAL(IN$(
   H,H+7)):GOTO 1420
OC 1416 TRAP 1417:V=VAL(OUT$(H,H+7)):GOTO
    1420
ZF 1417 V=0
GE 1420 SUM=SUM+V:NEXT Z:A=SUM:GOSUB 1248
   :RETURN
UG 1500 ? "K":? "- SMARTSHEET HELP SCREE
   N -":? :?
PH 1505 ? "  NORMAL CURSOR ARROW KEYS CON
   TROL THE":? "  CURSOR (LONG BLACK BAR)
   ."
AJ 1510 ? "  A...Z,";CHR$(34);"   Marks
   cell as a label":? "  0...9,+,-  Marks
    cell as a value"
RG 1515 ? "  :          Sum Formula. Tota
   ls values":? "              in a column
    or row."
RX 1520 ? "  OPTION     Marks cell as a f
   ormula":? "  SELECT     Main Menu. Cho
   ose from:-"
TC 1525 ? "              G=Global Format":
   ? "           L=Load Worksheet":? "
     S=Save Worksheet"
ME 1530 ? "              P=Print Worksheet
   ":? "           E=Erase Worksheet"
CB 1532 ? "              H=Home Cursor.(Ce
   ll A1)":? "           ?=Help Screen.
   "
IK 1535 ? "  START      Calculate Workshe
   et":? :? :? "- PRESS ANY KEY TO RETUR
   N -";:GET #2,K:GOTO 420
RO 1999 STOP
XC 2000 V$=" 1 2 3 4 5 6 7 8 91011121314
   516171819202122232425262728293031323333
   4353637383940"
AI 2005 H$="ABCDEFGHIJKLMNO":H(1)=7:FOR T
   =2 TO 4:H(T)=H(T-1)+8:NEXT T:POKE 5376
   0,200:GL=0
VC 2010 OUT$(1)=" ":OUT$(4800)=" ":OUT$(2
   )=OUT$:IN$=OUT$:S$(1)=" ":S$(600)=" ":
   S$(2)=S$
5J 2015 PR$(1)=" ":PR$(120)=" ":PR$(2)=PR
   $
CF 2020 X=1:Y=1:C$="        ":XMIN=X:YMIN
   =X:Y1=X:X1=X:XMAX=4:YMAX=20:CELL$="A1"
   :FL=0:CL$="     "
AP 2050 RETURN
XB 2100 CLOSE #1:RESTORE 2120:POKE 54286,
   192
RX 2105 READ E,DI$:IF E=PEEK(195) THEN PO
   SITION 8,1:? "Error:";DI$:TRAP 40000:
   GOSUB 210:GOTO 50
AM 2110 IF E=-1 THEN POSITION 8,1:? "Err
   or:No.";PEEK(195);"      ":TRAP 4000
   0:GOSUB 210:GOTO 50
RD 2115 GOTO 2105
QU 2120 DATA 138,Device Not On,139,Device
    NAK,140,Serial Frame,142,Serial Bus,1
   43,Checksum No.143
MO 2122 DATA 144,Write Protected,162,Disk
    Full,163,Bad DOS,167,File Locked,170,
   No such file,-1,a
```

□

Solve those TAPE PROBLEMS

by Derryck Croker

Some interest has been shown in a modification to the 410 recorder published by ANTIC magazine some time ago, known as the 'Hi-Rel' modification. No doubt the 1010 unit would benefit from the same type of modification, however be warned that if your cassette unit is still under warranty then you will void it if you open up the machine.

HOW DATA IS SAVED

To help us to understand the reasoning behind this modification it would help us to look at how data is transferred to and from the cassette.

The data to be saved is fed into the tape buffer on Page 4 of the computer in blocks of 128 bytes at a time, and a pointer keeps track of when the buffer is full. When it is full, it is sent to tape and a further 128 byte block is loaded into the buffer. Additional information is added to each block as it is sent out in order to help the O.S. with housekeeping. Each block is preceeded with two marker bytes. This pair of bytes has a start bit, with the remainder set to alternating 1's and 0's. The byte pair is terminated with a stop bit. Following the markers is a control byte, and then the data, in 128 byte blocks as you will recall. Bringing up the rear is a checksum byte, which is the sum of all of the bytes making up this package, including the marker bytes. You will see that 132 bytes are thus required to complete the transfer of each block of data.

With our buffer full, we are ready to save it to tape. Each byte is examined, and every bit that is set is converted to a tone of 5327 Hz, and every one that is not set is converted to one of 3995Hz, both tones supplied courtesy of POKEY.

So far so good, but we require to distinguish each block from the next, so a further marker tone is added to each block that is sent. You will have noticed this tone particularly when using LIST "C:", as the length of the tone is quite long. Long enough in fact that when you ENTER the program back, BASIC has time to check each line for correct syntax before the next block of data arrives. As the program length grows so the time taken for this process increases, until finally the tape motor stops until the checking has been completed. The long gap between blocks allows the motor to restart when the next block is requested, and the motor has time to run up to speed again before the next block arrives.

So, we have converted our program into two audio tones to be recorded on tape, and so far we could have pressed an ordinary domestic recorder into service. However, there are no facilities in the computer to convert the two tones back into data. Instead they are converted back into data in the recorder using a process called FSK, or frequency shift keying. This is the reason why we must use the official Atari recorder, or buy an interface to use with a domestic recorder. Such an interface will convert the two tones for us, usually employing a circuit called a phase locked loop, not something we will go into now, but if you wish to buy one then make sure that it has facilities for remote control of your recorder and that it takes advantage of the 'sound through' capability. The recorder will require a remote control socket and it must be stereo for these two items to function.

WHY A MODIFICATION?

And now we get to the ANTIC modification. As we have seen, the requirement for converting the two tones (we will call the 5327Hz tone a 'mark' and the 3995Hz tone a 'space') is met by circuitry inside the cassette deck. On playback, the tones from the playback head are fed to two filter circuits, each of which is designed to pass through only the tone for which it has been tuned. The outputs from both filters, of which one will only pass a 'mark' and the other a 'space', are then fed to another circuit called a comparator, and the output from this is the data, formed from 1's and 0's, just as it was inside the computer when we saved it to tape.

Assuming, then, that no spurious signals have interfered with the data to your computer, what happens next? Well, the data, now in digital form as we have seen, is received in the tape buffer in the same order that it was sent, that is two marker bytes, a control byte, the block of data and bringing up the rear, the checksum byte.

The two marker bytes are used by the O.S. to set the baud rate for that block by storing the current VCOUNT value from ANTIC when the start bit arrives. The alternating 1's and 0's are counted off until the stop bit is reached, whereupon the current frame counter is compared with the VCOUNT value previously stored. The resulting time elapsed allows the O.S. to determine the speed at which the next block is to arrive as it is necessary to maintain a pointer to keep track of incoming data to determine when the buffer is full. You will see that this calculation is carried out for each block which allows adjustment for stretched tape or motor speed (within reason).

The baud rate has a default setting of 600 by the way, but can vary from 318 to 1407. It is possible to change the baud rate with a suitable program, but it is likely that unreliable results will occur if speeds above 847 are used due to limitations within the system.

The control byte's only function is to inform the O.S. that the end of the file has been reached.

The checksum byte, which we have seen is the sum of all the bytes in the particular block, completes the procession. It is obvious that a single byte cannot possibly store such a large number that usually results, so a complicated formula is used to reduce the sum to a reasonable figure, as is done when the figure was originally computed.

This checksum as retrieved from tape is compared with another computed from the present contents of the buffer, and if there are any discrepencies due perhaps to spurious data introduced in the FSK demodulating process then the loading process stops and we get an error, 143.

That is the theory anyway. Many things conspire against the successful retrieval of data. One of them is that Atari used components in the filters that were not of the highest tolerance.

continued overleaf

TAPE PROBLEMS continued

That is to say that the values of the resistors used in this part of the circuit could vary from the designed values by up to 10%. It is therefore possible that the response of the filters may then become inaccurate and thus pass through the tone designated for the other filter.

The 'Hi Rel' modification redresses the problem by the replacement of 6 resistors, 3 per filter, with ones of the same value but of the much closer tolerance of 1%.

And the resistors to be changed? Below you will find the components involved for both the 410 and 1010 units. If you cannot read resistor colour codes or wield a soldering iron then you may care check the panel with this article.

410		1010	
Ref	Value	Ref	Value
R10	68K	R111	68K
R11	56K	R112	56K
R12	7K5	R113	10K
R13	5K6	R115	6K2
R14	330K	R149	330K
R15	240K	R114	330K

Two of these resistors, R14 and R15 (and the corresponding 1010 components) are connected in a feedback loop from the LM324 I.C, from pin 7 to 6 and 1 to 2 respectively.

The remaining resistors set up D.C. bias levels and input levels. Some tracing of the circuit is required to locate these components on the 410 board, however the 1010 has the reference numbers printed on the board. Look for two pairs of capacitors on the 410 board of value 820pf, and you should find that each pair is connected across R14 and R15 respectively. You should now be able to find R10 and R12 connected to the junction of one pair of capacitors, and you should find that R12 is connected to earth, and R11 and R13 to the junction of the other pair of capacitors. In this case R13 is connected to earth. As a further check, the other ends of R10 and R11 are connected together, and it is this junction which carries the output from the playback amplifier, pin 14 of the I.C.

The author is willing to undertake this modication and some others for a small fee. Please note that this service is supplied directly by the author and not through PAGE 6 which can accept no responsibility for any problems which may arise.

The services offered and costs are as follows.

410/1010 resistor change inc. components, clean heads and pinchwheel. £5.50

410 addition of red LED 'busy' lamp to illuminate when drive motor active. Specify left or right hand fitting. £1.50

1010 Rewire present LED to illuminate only when transport controls pressed. £1.00

Send your cassette unit and power supply only. Please note that I cannot undertake to repair faulty units. Terms are cheque or postal order, *and you must include return carriage.* **Don't forget your return address. Make a careful note of the serial number of the machine before you send it.**

Please telephone me first with your requirements on 0923 673719. Derryck Croker.

IDENTIFY YOUR PROBLEM FIRST

I said that many things conspire against the successful transfer of data from tape, and if you are having difficulties you must ascertain whether the problem is due to the one outlined, or whether another problem exists. If you find that tapes recorded on your machine won't load, but load correctly on other machines then the above fix will probably deal with the problem, and no doubt you will have had problems with commercial programs too. Another problem exists if tapes recorded on your machine load back but not on other machines, and in this case it is likely that the record/playback head requires adjustment. This is a job best left to an Atari service centre.

In our seemingly never-ending mission to achieve good results from the cassette recorder we must also service it from time to time. No recorder whether digital or Hi-Fi can be expected to give of its best if the heads or the tape transport mechanism are dirty. Filthy capstans and pinch-wheels cause tape speed variations and caked up heads may prevent the successful reading of the tones from tape.

The technique is simple. Obtain some cotton buds and a can of electrical cleaner. Check first that it does not contain any lubricant, I use R.S. cleaning fluid.

Spray the bud and press the 'PLAY' button on the deck to make the heads move into a position where they can be cleaned with a gentle up-and-down movement with the bud. Work quickly as the cleaner rapidly evaporates. You will see the capstan and rubber pinchwheel to the right of the heads. Boot BASIC and type, in direct mode, POKE 54018,52 RETURN. With the capstan now turning clean it and the pinchwheel with the bud. Finally, stop the machine and remove any loose cotton wool with your finger nail. You will find that surprising amounts of brown tape deposit collects, and often this deposit will be the cause of loading errors.

This cleaning process is also invaluable on plug-in boards such as cartridges and edge connectors on memory boards etc. in which the 800 abounds! ●

TRICKY CUBES

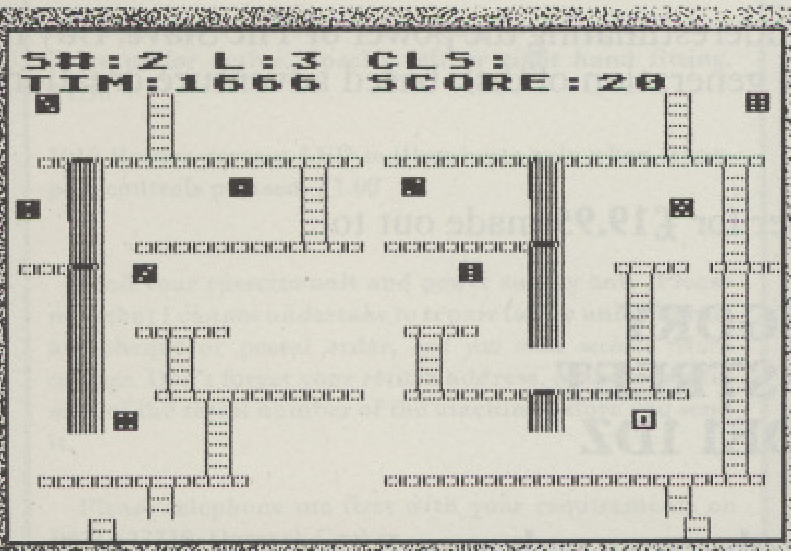
TRICKY CUBES does not aim to attract people whose interest in computer gaming is mainly concentrated on increasing their high scores by permanently hitting fast moving and noisy targets, though it requires quite some skill in joystick handling to successfully pass through all six screens. The challenge of TRICKY CUBES is more in the strategic approach to find the most economic and the least time consuming path to reach the final goal of the game. Therefore, people who consider a 'fast thumb' to be the most desirable attribute for a successful 'high-score' should be warned that they may find TRICKY CUBES somewhat slow. Others though will find it quite a challenge.

THE GAME

The goal of TRICKY CUBES is quite simply to manoeuvre a little character - let us name him 'Clumsy Pete' - safely through six different screens and to pass and erase all sixty cubes placed on the screens, in the shortest time possible.

This does not sound too exciting nor particularly tricky, but the secret with these cubes is that some of them, when touched and erased, only increase the score whereas others additionally open and/or close downward chutes. This can either facilitate the straight continuation of Clumsy Pete's path to reach the next cube or may result in a longer and more risky deviation. Involuntarily falling down a chute may force Pete to use a dangerous moving bar to continue his path. It may even happen that once a chute is opened or closed it remains so until the end of the game and some of the cubes will be out of the reach of Pete. This is where the challenge begins and is why we call those cubes 'tricky'. It is unlikely that you will manage to complete all six screens before finding out how some of the cubes influence the entrances of the chutes. This is the way to gain experience in leaving certain cubes untouched in the early stage of the game and only erasing them when the most favourable order is evident.

When beginning the game, or upon entering a new lap, the starting position of Clumsy Pete is always situated on screen No. 1. Each screen provides six transitions to adjacent screens that can be passed at any time. This is illustrated in the accompanying printout of screen No. 2.



Screen 2

The horizontal transition steps to adjacent screens are preset to a value of 1 and the corresponding value for vertical transitions between screens is 2. For these initial conditions, the following transitions to adjacent screens are possible with the starting screen always being No.1:

3	4	5	6	1	2	3	4
5	6	1	2	3	4	5	6
1	2	3	4	5	6	1	2
3	4	5	6	1	2	3	4

This configuration applies only to the first lap after booting the game. When the 'GAME OVER' display appears after either the number of lives equals zero or the allowed time has elapsed or when all cubes have been successfully erased, the next lap is enabled through pushing the START key. Then, the horizontal and vertical screen transition values are randomly chosen allowing for a total of 16 additional variations of adjacent screen configurations. Only the starting position of Clumsy Pete remains unchanged, it is always on screen No. 1. Each time the game is played therefore, alternative strategies are required and consequently the player is forced to memorize the changing screen configurations.

MOVEMENT

The movements of Clumsy Pete are easy enough. Movements to the right or to the left on the girders as well as up and down on the ladders are enabled by pushing the joystick into the desired direction. The trigger causes Pete to jump for cubes. Cubes touched will disappear from the screens until the end of the game.

Upon contact with a moving bar Pete will be automatically lifted up or taken down as long as no joystick signals cause him to leave the bar. To disembark from this platform requires spilt second timing by moving in the direction of an adjacent girder. If you miss that fraction of a second the number of lives will be reduced by one.

SCORING

The scoring of TRICKY CUBES is as follows:

10 points are awarded for touching and erasing any of the cubes. Once all ten cubes are removed from one screen you are rewarded with a bonus dependent on the time indicated on the display. This time dependent scoring encourages special strategies to complete individual screens in the early stages of a game rather than following the most economic path to remove all 60 cubes.

Track of the actual situation is kept by displaying the major features at the top of the screens. Upon STARTing a new round, time countdown starts at 2800 time units. The number of lives still left and the actual score are also shown. If you want to know which screen Clumsy Pete is actually moving in you should have a look at the upper left corner of the display. Additionally, once you have removed the last cube from a screen, the number of this screen together with all screens completed so far is indicated in the right part of the score display. This allows for quick information about the screens still to be cleared at any stage of the game.

TRICKY CUBES TRICKY CUBES

by Peter and Stephan Ohlmeyer

PLAY IT!

This is almost everything you must know about TRICKY CUBES. Now you only have to play it and you will find out for yourself whether it really is tricky or not. I hope that you will have as much fun trying to solve it as we (the game was programmed together with my 16 year old son) had developing it and making it tricky.

When firstly trying to get through to a 'happy' end you might get the impression that it is very unlikely to succeed in erasing all cubes before the time has run out. Believe me that it is not impossible (nor is it very easy!) to manoeuvre Clumsy Pete through all handicaps until the screen finally turns into the 'GREAT SCORE' display. When you have succeeded in reaching the GREAT SCORE you should try Listing 2. This is the 'ultimate ' challenge!

THE LISTINGS

There is nothing very particular about the listings. Together with the list of variables and the program breakdown they are more or less self-explanatory. Just type in listing 1 correctly and save it to disk or cassette. If you are using disk use a filename such as "D:CUBESONE.BAS". Now you simply have to RUN the game as described above.

For all those who after some practice have managed to see the 'GREAT SCORE', and then tend to share our opinion that TRICKY CUBES really is tricky and challenging enough to deserve it's name, we have added listing 2 which contains six completely different and much more sophisticated screens. This advanced version is what we consider to be the 'real challenge'.

If you feel encouraged by the initial version to also experience the advanced level, take the time to type in listing 2 as a separate listing and save it using the LIST command. If you are using cassette type LIST "C:" to save it to tape. If you are using disk type LIST "D:CUBESTWO.BAS". Next CLOAD or LOAD Listing 1 and then ENTER Listing 2 by typing ENTER "C:" or ENTER "D:CUBESTWO.BAS". The two listings will then merge into one and you are ready to RUN the advanced version.

It would be interesting for us to know how long it took until you saw the 'GREAT SCORE' of this version without changing the time units set at 4000. It is possible.

PROGRAM BREAKDOWN

line	function
10-40	initial title
50-210	main loop
220-300	which screen next
310-390	erase cubes and display score
400-420	player movement in chutes
430-490	player on moving bar
500-610	player dead
620-800	open and close chutes
810-1470	main title, game over, once more
1480-2780	screens 1 to 6
2800-2990	print cubes and chute opening
3200-3250	display list
3260-3340	PM initialization
3350-3400	character set from ROM to RAM
3410-3460	positions for cubes and bars
3480-4180	DATA

```
EI 1 REM *********************************
DH 2 REM *          TRICKY CUBES         *
LR 3 REM *               by              *
LH 4 REM * PETER and STEPHAN OHLMEYER    *
MP 5 REM * ----------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND    *
EO 7 REM *********************************
NN 8 REM
BN 10 GRAPHICS 17:POKE 708,10:POKE 710,88
   :POSITION 6,9:? #6;"LOADING":POSITION
   4,12:? #6;"TRICKY CUBES"
PX 20 FOR W=1 TO 750:NEXT W:GRAPHICS 0:PO
   KE 712,6:POKE 559,0:GOTO 3210
YA 30 POKE 756,AC:POKE 82,0:POKE 623,C1:P
   OKE 53278,0:YB=77:ZB=4
YO 40 GS=1:HS=C1:VS=C2:ANZ=9:TIM=2800:GOT
   O 810
BW 50 REM *** MAIN LOOP ***
QP 60 S=STICK(0):IF STRIG(0)=0 THEN GOSUB
    320
TJ 70 X=X+((S=C7)-(S=C11))*C4:IF S=C7 THE
   N POS=PR:GOSUB 210
CW 80 IF S=C11 THEN POS=PL:GOSUB 210
QC 90 POKE 53278,0:GOSUB 390:GOSUB 200:IF
    X>202 OR X<C46 THEN 220
DV 100 IF PEEK(53260) THEN 430
HB 110 LOCATE (X-C46)/C4,INT((Y-C11)/C8),
   ZZ:IF ZZ=111 OR ZZ=99 THEN POS=PH:GOTO
    150
NK 120 IF ZZ=105 THEN 410
VT 130 IF ZZ=C32 THEN 510
QD 140 GOSUB 170:GOTO 60
HU 150 S=STICK(0):Y=Y+((S=C13)-(S=C14))*C
   8:GOSUB 390:GOSUB 200:GOSUB 170:IF S=C
   13 OR S=C14 THEN GOSUB 210
UV 155 IF Y<C43 OR Y>195 THEN 220
XN 160 LOCATE (X-C46)/C4,INT((Y-C11)/C8),
   ZZ:IF ZZ<>99 THEN 60
OK 165 GOTO 150
```

VARIABLES USED

ANZ	No. of lives
BP(SCR)	horizontal position of moving bars
CC(n)	flag for opening and closing chutes
CHM$	routine to move character set
GS	flag to print START or not
HS, VS	screen transition values
NCB	new character set base
NAM$	title string
PMOV$	Tom Hudson's PM mover (ANALOG Computing)
POS	actual player shape
PB$	shape of moving bar
PH$	player on ladder or jumping
PL$	player moving left
PR$	player moving right
PT$	player in chutes
SCR	actual screen No.
SC	score
TIM	time units actually left
TSC	number of screens completed
WL(SCR)	flag for cube positions
X, Y	actual player position
XC, YC	cube positions
XL, YL	flags for cubes to be erased
YB	vertical positions of moving bars
ZB	step width for bar movement

```
DT 170 TIM=TIM-C1:POSITION 24,C2:? #6;TIM
   ;" ":IF TIM=0 THEN 590
RV 180 IF TIM<100 THEN SOUND 0,40+TIM,C14
   ,C14
ZP 190 RETURN
AR 200 YB=YB+ZB:A=USR(MOVE,1,PMB,PB,BP(SC
   R),YB,C3):IF YB>196 OR YB<76 THEN ZB=-
   ZB
ZN 205 RETURN
HM 210 SOUND 0,100,C2,C12:SOUND 0,0,0,0:R
   ETURN
NY 220 REM *** GOTO SCREEN ***
GK 230 IF X>202 THEN SCR=SCR+H5:X=C46:GOT
   O 270
MQ 240 IF X<C46 THEN SCR=SCR-H5:X=202:GOT
   O 270
PL 250 IF Y<C43 THEN SCR=SCR-V5:Y=195:GOT
   O 270
DD 260 IF Y>195 THEN SCR=SCR+V5:Y=C43
YK 270 IF SCR<C1 THEN SCR=SCR+C6
DX 280 IF SCR>C6 THEN SCR=SCR-C6
EZ 290 GOSUB 390:POKE 559,0:POKE 87,0
RR 300 GOSUB SCR*220+1260:POSITION C3,C1:
   ? SCR:POKE 559,62:GOTO 60
XB 310 REM *** SCORES ***
ME 320 POS=PH:FOR W=C1 TO C8:Y=Y-C2:SOUND
    0,50-W,C14,C10:GOSUB 390:NEXT W:SOUND
    0,0,0,0
EV 330 ZX=(X-C46)/C4:ZY=(Y-19)/C8:LOCATE
   ZX,ZY,ZZ:IF ZZ<112 OR ZZ>121 THEN 380
OT 340 WL(SCR)=WL(SCR)+C1:SC=SC+10:SOUND
   0,120,C14,C14:POSITION 35,C2:? SC:FOR
   W=C1 TO C20:NEXT W
KA 350 SOUND 0,0,0,0:IF WL(SCR)=C10 THEN
   SC=SC+INT(TIM/3):POSITION 12+SCR,C1:?
   SCR:POSITION 35,C2:? SC:TSC=TSC+1
MH 360 IF TSC=C6 THEN SC=SC+300:POSITION
   35,C2:? SC:GOTO 590
OA 370 XL(SCR,WL(SCR))=ZX:YL(SCR,WL(SCR))
   =ZY:POSITION ZX,ZY:? CHR$(C32):IF ZZ>1
   17 AND ZZ<122 AND SCR>1 THEN GOSUB 630
OL 380 FOR W=C1 TO C8:Y=Y+C2:GOSUB 390:NE
   XT W:IF S<>15 THEN RETURN
KY 390 A=USR(MOVE,0,PMB,POS,X,Y,C10):RETU
   RN
KW 400 REM *** CHUTE ***
WL 410 POS=PT:Y=Y+C2:SOUND 0,Y-50,C14,C10
   :GOSUB 390:LOCATE (X-C46)/C4,INT((Y-C1
   1)/C8),ZZ:IF ZZ=C32 OR ZZ=105 THEN 410
FZ 420 SOUND 0,0,0,0:POS=PR:GOTO 60
KQ 430 REM *** MOVING BARS ***
ZC 440 YB=YB+ZB:Y=YB-C10:X=BP(SCR)+C2:A=U
   SR(MOVE,1,PMB,PB,BP(SCR),YB,C3):GOSUB
   390
SN 450 IF YB>196 OR YB<76 THEN ZB=-ZB
JX 460 IF STICK(0)=C7 THEN X=X+C4:POS=PR:
   Y=INT((Y-C4)/C8)*C8+11:GOTO 90
EH 470 IF STICK(0)=C11 THEN X=X-C8:POS=PL
   :Y=INT((Y-C4)/C8)*C8+11:GOTO 90
OX 490 GOTO 440
II 500 REM *** FAST DOWN ***
MD 510 IF PEEK(53260)<>0 THEN 430
BC 520 ANZ=ANZ-C1
HG 530 IF ANZ=0 THEN IF Y=209 THEN 590
YQ 540 Y=Y+C2:SOUND 0,Y,C14,C10:GOSUB 390
KR 550 IF Y=211 THEN 570
OR 560 GOTO 530
YN 570 POKE 559,0:POSITION C7,C1:? ANZ:SC
   R=1:X=94:Y=67:SOUND 0,0,0,0
QF 580 GOTO 290
BC 590 SOUND 0,0,0,0:POS=PH:X=108:Y=185:A
   =USR(MOVE,1,PMB,PB,0,0,C3):A=USR(MOVE,
   0,PMB,POS,0,0,C10)
HC 600 FOR W=C4 TO 21:FOR W1=0 TO 39:POSI
   TION W1,W:? CHR$(C32):NEXT W1:SOUND 0,
   (W-C3)*C15,C14,C14:NEXT W
CV 610 SOUND 0,0,0,0:FOR W=C1 TO 200:NEXT
    W:GOTO 810
UU 620 REM *** OPEN CHUTES ***
DY 630 ON SCR-C1 GOTO 640,670,700,730,770
ZP 640 IF ZZ=118 THEN POSITION C3,C12:? "
   i":POSITION C3,C7:? "i":RETURN
AN 650 IF ZZ=120 THEN CC(1)=1:POSITION 27
   ,C18:? "i":POSITION C3,C7:? "h":RETURN
RZ 660 CC(2)=1:POSITION 27,C11:? "i":POSI
   TION 27,C7:? "h":RETURN
RU 670 IF ZZ=119 THEN CC(3)=1:POSITION 30
   ,C7:? "i":POSITION 30,C15:? "i":RETURN
TO 680 IF ZZ=120 THEN POSITION 30,C15:? "
   h":RETURN
ZK 690 CC(4)=1:POSITION 30,C15:? "i":RETU
   RN
OJ 700 IF ZZ=119 THEN CC(5)=1:POSITION C3
   ,C12:? "h":RETURN
XN 710 IF ZZ=120 THEN POSITION C18,C7:? "
   h":RETURN
WZ 720 CC(6)=1:POSITION C18,C7:? "i":RETU
   RN
IM 730 IF ZZ=118 THEN POSITION C10,C7:? "
   i":POSITION C10,C14:? "h":RETURN
WK 740 IF ZZ=119 THEN CC(7)=1:POSITION C1
   0,C7:? "i":RETURN
YW 750 IF ZZ=120 THEN CC(8)=1:POSITION C1
   0,C14:? "i":RETURN
JF 760 POSITION C10,C7:? "h":POSITION C10
   ,C14:? "i":RETURN
MH 770 IF ZZ=118 THEN POSITION C17,C10:?
   "h":RETURN
TH 780 IF ZZ=119 THEN CC(9)=1:POSITION C1
   7,C18:? "h":RETURN
VF 790 IF ZZ=120 THEN POSITION C17,C18:?
   "i":RETURN
OZ 800 CC(10)=1:POSITION C17,C10:? "i":RE
   TURN
OQ 810 REM *** TITLE ***
VR 820 POSITION 0,C8:? "      bodaaabodaa
       aabodaaabod    ";
AS 830 ? "    ecf     ecf              ecf
      ecf     ";
AU 840 ? "    ecf     ecf              ecf
      ecf     ";
AW 850 ? "    ecf     ecf              ecf
      ecf     ";
WF 860 ? "    ecf     aoaaa          aaaoa
      ecf     ";
XS 870 FOR W=C13 TO C16:POSITION 0,W:? "
      ecf                          ecf
      ";:NEXT W
XU 880 ? "      aoaghjaaaaaa        aaaaaa
      ghjaoa  ";
TK 890 ? "        kil
      kil     ";
ST 900 ? "        kil
      kil     ";
CQ 910 POSITION 0,22:? "        abodaaaaa
         aaaaaboda        ";
CN 920 ? "       ecf
      ecf  ";
KK 930 POKE 559,62:IF ANZ=0 OR TIM=0 THEN
    1370
WU 940 IF TSC=C6 THEN 1380
UD 950 POSITION C14,C12:? "pzqzrzszstzuz":
   FOR W=C1 TO C15:NEXT W:POSITION C15,C1
   7:? "yzwzvzxzyz"
ZT 960 NAM$="                   P.+S. OHLMEYER
   "
FQ 970 FOR W=C1 TO C15:POSITION C3,C1:? N
   AM$(W,W+C13):SOUND 0,250-W*C14,C10,C14
   :SOUND C1,W*C14-C1,C10,C12
QA 980 FOR W1=C1 TO C15:NEXT W1:NEXT W:SO
   UND 0,0,0,0:SOUND C1,0,0,0
AX 990 FOR W=C1 TO 50:NEXT W:POSITION 26,
   C2:? #C6;"JAN 1985":FOR W=C1 TO 50:NEX
   T W
```

```
DQ 1000 X=102:Y=147:POS=PR:GOSUB 390:FOR
    W=C1 TO 100:NEXT W
PM 1010 FOR W1=5 TO C1 STEP -1:FOR W2=C1
    TO C2:X=X+C4:POS=PH:GOSUB 390:NEXT W2:
    GOSUB 1030
IO 1020 NEXT W1:GOTO 1100
LF 1030 POSITION (X-50)/C4,(Y-C11)/C8
YW 1040 ON W1 GOTO 1050,1060,1070,1080,10
    90
OX 1050 ? "─┼":GOSUB 1240:RETURN
NF 1060 ? "▖┌":GOSUB 1240:RETURN
MY 1070 ? "▖┼":GOSUB 1240:RETURN
LP 1080 ? "▔▁":GOSUB 1240:RETURN
HI 1090 ? "◥◢":GOSUB 1240:RETURN
WJ 1100 FOR W=C1 TO C11:X=X+C4:POS=PR:GOS
    UB 390:NEXT W
SM 1110 FOR W=C1 TO C18:Y=Y-C4:POS=PH:GOS
    UB 390:NEXT W
FU 1120 FOR W=C1 TO C6:X=X-C4:POS=PL:GOSU
    B 390:NEXT W
CD 1130 FOR W=C1 TO C8:Y=Y+C4:POS=PH:GOSU
    B 390:NEXT W
DV 1140 FOR W=C1 TO C3:X=X-C4:POS=PL:GOSU
    B 390:NEXT W
WS 1150 FOR W1=C1 TO C6:FOR W2=C1 TO C2:X
    =X-C4:POS=PH:GOSUB 390:NEXT W2:GOSUB 1
    160:NEXT W1:GOTO 1250
SP 1160 POSITION (X-C46)/C4,(Y-C11)/C8
WP 1170 ON W1 GOTO 1180,1190,1200,1210,12
    20,1230
KF 1180 ? "▀":GOSUB 1240:RETURN
IW 1190 ? "◢◣":GOSUB 1240:RETURN
GL 1200 ? "◥◢":GOSUB 1240:RETURN
FC 1210 ? "┐/":GOSUB 1240:RETURN
DT 1220 ? "┘┤":GOSUB 1240:RETURN
WH 1230 ? "├┃"
RM 1240 SOUND 0,120-W1*5,C14,C14:SOUND 1,
    150-W1*5,C10,C14:FOR W=1 TO 20:NEXT W:
    SOUND 0,0,0,0:SOUND 1,0,0,0:RETURN
ET 1250 FOR W=C1 TO C4:X=X-C4:POS=PL:GOSU
    B 390:NEXT W
EK 1260 FOR W=C1 TO C8:Y=Y-C4:POS=PH:GOSU
    B 390:NEXT W
AC 1270 FOR W=C1 TO C6:X=X-C4:POS=PL:GOSU
    B 390:NEXT W:POS=PH:GOSUB 390:GOSUB 13
    90
GO 1280 FOR W=0 TO C17:POSITION W,C1:? CH
    R$(C32):POSITION 20+W,C2:? CHR$(C32):N
    EXT W
JS 1290 POSITION 0,C1:? #C6;"SC:  L:  CLS
    B":POSITION 20,C2:? #C6;"TIM:     SCOR
    E:"
KW 1300 FOR W=C1 TO C18:Y=Y+C4:GOSUB 390:
    NEXT W
JK 1310 FOR W=C1 TO C3:X=X+C4:POS=PR:GOSU
    B 390:NEXT W
SF 1320 FOR W=C1 TO C8:Y=Y-C2:SOUND 0,50-
    W,C14,C10:POS=PH:GOSUB 390:NEXT W:SOUN
    D 0,0,0,0
QI 1330 POSITION C7,C17:? "i":FOR W=C1 TO
     C14:Y=Y+C4:POS=PT:GOSUB 390:NEXT W
NQ 1340 POS=PH:GOSUB 390:FOR W=C1 TO C10:
    NEXT W:FOR W=C1 TO 5:Y=Y+C4:GOSUB 390:
    NEXT W
TE 1350 X=74:Y=C43:POKE 559,0:GOSUB 1460:
    GOSUB 1480:GOSUB 390:POKE 559,62
HF 1360 FOR W=C1 TO C6:Y=Y+C4:GOSUB 390:N
    EXT W:FOR W=C1 TO C4:X=X+C4:POS=PR:GOS
    UB 390:NEXT W:GOTO 60
UW 1370 POSITION C16,C8:? "◥▗▟▘┬▖┌":POSI
    TION C16,C12:? "◥┤┗┘┤":GOTO 1390
UO 1380 POSITION C15,C8:? "◥▗┤▖┘▀┤├┃":PO
    SITION C15,C12:? "─┼◥◢◣┘┤▖┌"
RD 1390 POSITION C15,22:? "─┼├ ├▁┤├┃":GO
    SUB 390:IF PEEK(53279)<>6 THEN 1390
WJ 1400 IF GS=1 THEN GS=0:RETURN
LV 1410 X=94:Y=67:YB=77:POKE 53278,0:POS=
    PR:GOSUB 1420:GOTO 290
RM 1420 FOR W=C1 TO C10:WL(W)=0:CC(W)=0:N
    EXT W
CQ 1430 FOR W=C1 TO C6:FOR WP=C1 TO C10:X
    L(W,WP)=0:YL(W,WP)=4:NEXT WP:NEXT W
IZ 1440 POSITION C13,C1:? "     ":POSITI
    ON 35,C2:? "    "
KO 1450 HS=INT(RND(C1)*5)+C1:VS=INT(RND(C
    1)*5)+C1:IF HS=VS OR HS=C2*VS OR VS=C2
    *HS THEN 1450
CN 1460 SCR=C1:SC=0:ANZ=9:TSC=0:TIM=2800
BH 1470 POSITION C3,C1:? SCR:POSITION C7,
    C1:? ANZ:POSITION 24,C2:? TIM:POSITION
     35,C2:? SC:RETURN
IT 1480 REM *** SCREEN 1 ***
LF 1490 POSITION 0,4:? "  z    ecf
          z  ecf   ";
AV 1500 ? "        ecf
    ecf     ";
AY 1510 ? "        ecf
    ecf     ";
MT 1520 ? " bodaaaoaaaaa aaaaaaaaaaabod
    ecf     ";
UT 1530 ? " ecf                      ecf
         ";
OY 1540 ? " ecf          z        z  ecf
    z ecf   z";
UZ 1550 ? " ecf                      ecf
    ecf     ";
VC 1560 ? " ecf                      ecf
    ecf     ";
VC 1570 ? "abod  bodaa        bodaa  aoa
    a aoaboda";
XJ 1580 ? " ecf  ecf          ecf
       z ecf    ";
EQ 1590 ? " ecf  ecf          ecf
    ecf     ";
DR 1600 ? " ecf  ecf          ecf
    ecf     ";
PV 1610 ? " ecf  ecf          ecf    z bo
    daaa  ecf ";
BX 1620 ? " ecf  aoaaaaaa aabodoa     ec
    ecf     ";
GM 1630 ? " ecf               ecf     ec
    f  ecf ";
DS 1640 ? " ecf  z          aoaaaabodaaao
    a   z ecf ";
ND 1650 ? " ecf                  ecf
    ecf     ";
NG 1660 ? " ecf                  ecf
    ecf     ";
HD 1670 ? " aoaaabodaaaaa        aaoaaaa
    aaabodaoa ";
HT 1680 ? "        ecf
    ecf     ";
IK 1690 GOSUB 2800:RETURN
IW 1700 REM *** SCREEN 2 ***
PR 1710 POSITION 0,4:? "    z    ecf
                 ecf       z";
BF 1720 ? "        ecf
    ecf     ";
BI 1730 ? "        ecf
    ecf     ";
IN 1740 ? " aghjaaoaaaaaaboda aaaaaaagija
    aaaaoabod ";
CW 1750 ? " kil        z ecf      z   kil
    ecf     ";
FH 1760 ? " zkil            ecf       eil
    zecf    ";
XY 1770 ? " eil             ecf       eil
    ecf     ";
UL 1780 ? " eil  aaaaaaaaaoaa aaaaaaaghn
    ecf     ";
ML 1790 ? "aaghn   z                z kil
    boda boda";
MN 1800 ? " kil                       kil
    ecf  ecf ";
```

```
MQ 1810 ? "  kil                          kil
    ecf  ecf ";
QY 1820 ? "  kil aboda              boda  kil
    ecf  ecf ";
XD 1830 ? "  kil  ecf               ecf
    ecf  ecf ";
XG 1840 ? "  kil  ecf               ecf
    ecf  ecf ";
SS 1850 ? "  kil  aobodaaaaaa  aoaaaaghja
   aaoaa ecf ";
KF 1860 ? "  kil z  ecf               kil
      z  ecf ";
XK 1870 ? "            ecf
         ecf ";
XN 1880 ? "            ecf
         ecf ";
AB 1890 ? " aaaabodaoa          aaaaaaaaaa
   aaabodaoa ";
RX 1900 ? "        ecf
     ecf";
HS 1910 GOSUB 2800:RETURN
KB 1920 REM *** SCREEN 3 ***
KX 1930 POSITION 0,4:? "     z ecf
            z     ecf    ";
BP 1940 ? "        ecf
     ecf     ";
BS 1950 ? "        ecf
     ecf     ";
LI 1960 ? "    aaaaoaaaa aaaaaabod    aaag
   hjaaoaaa   ";
NK 1970 ? "                      ecf    z  k
   il         ";
JV 1980 ? "     z      z         ecf       k
   il       z";
WM 1990 ? "                      ecf       k
   il         ";
IA 2000 ? "                      aoaabod  k
   il         ";
FD 2010 ? "abod     aaaa abod  z    ecf   k
   il    bodaa";
MQ 2020 ? " ecf              ecf      ecf
         ecf  ";
MT 2030 ? " ecf              ecf      ecf
         ecf  ";
BX 2040 ? " aobod            aoaaa   aoaaaaag
   ijaaaaoa  ";
IT 2050 ? "     ecf                         k
   il       z";
RQ 2060 ? "     ecf                 z       k
   il         ";
UM 2070 ? "     aoaaaaaaa abod               k
   il         ";
WW 2080 ? "      z         ecf     bodabod k
   il   aabod ";
KZ 2090 ? "                  aobod   ecf ecf
         ecf ";
CO 2100 ? "                      ecf  ecf ecf
         ecf ";
TY 2110 ? "     aaabodaaa      aoaaaaoa aoaaa
   aaabodaoa ";
RO 2120 ? "        ecf
     ecf";
HJ 2130 GOSUB 2800:RETURN
KN 2140 REM *** SCREEN 4 ***
DQ 2150 POSITION 0,4:? "     z ecf
            z     ecf     ";
BG 2160 ? "        ecf
     ecf      ";
BJ 2170 ? "        ecf
     ecf      ";
JB 2180 ? "    aaaaoabodaaaaaghjaabodaaaaa
     aoabod ";
PJ 2190 ? "            ecf      kil  ecf
         ecf ";
TA 2200 ? "  z          ecf     z kil  ecf  z
        z ecf ";
ON 2210 ? "             ecf       kil  ecf
         ecf ";
OQ 2220 ? "             ecf       kil  ecf
         ecf ";
LO 2230 ? "aagijaaaaaoaaaa   kil  aoaaa
   aaaaaaoaa";
ZQ 2240 ? "  kil                kil
          ";
UB 2250 ? "  kil       z        kil     Z
         z ";
ZW 2260 ? "  kil                kil
          ";
ZZ 2270 ? "  kil                kil
          ";
WB 2280 ? "  kil  aabod        kil  aaaaaaa
   aaaabod  ";
NJ 2290 ? "  kil       ecf      kil
         ecf  ";
WQ 2300 ? "  kil       ecf      kil     Z
         ecf ";
OL 2310 ? "             ecf
         ecf  ";
OO 2320 ? "             ecf
         ecf  ";
VM 2330 ? " aaaabodaoaaaaaaaaaaaaaaaaaaa
   aabodoa  ";
RY 2340 ? "        ecf
     ecf";
HT 2350 GOSUB 2800:RETURN
LS 2360 REM *** SCREEN 5 ***
KK 2370 POSITION 0,4:? "    z  ecf
     z            zecf    z";
BQ 2380 ? "        ecf
     ecf      ";
BT 2390 ? "        ecf
     ecf      ";
QY 2400 ? " aabodaoagijaaaaaaaaaa aaaaaaa
   aaaaoabod ";
YC 2410 ? "  ecf    kil       z
        ecf ";
UV 2420 ? "  zecf    kil
        ecf ";
IW 2430 ? "  ecf    kil
        ecf ";
EH 2440 ? "  ecf    kil  bodaaaaa abod
        ecf ";
NO 2450 ? "aaaaoa    kif  ecf          ecf  b
   odaaaaboda";
UF 2460 ? "          kif  ecf          ecf  e
   cf   ecf ";
WU 2470 ? "  z          mhjaaaoa       ecf  a
   obod  ecf ";
XM 2480 ? "              kil       z    ecf  z
   ecf zecf ";
GV 2490 ? "              kil              ecf
   ecf  ecf ";
VD 2500 ? " aaabod   kil                ecf
   ecf  ecf ";
GF 2510 ? "  ecf    kil  bodaaaaa   aoaaa
    aoaaaecf ";
YY 2520 ? "  ecf    kil   ecf
        ecf ";
RI 2530 ? "  ecf          ecf
        ecf ";
RL 2540 ? "  ecf          ecf
        ecf ";
PD 2550 ? " aaaaobodaaaaaaoaa         aaaaaaa
   aaabodaoa ";
SI 2560 ? "        ecf
     ecf";
ID 2570 GOSUB 2800:RETURN
MX 2580 REM *** SCREEN 6 ***
JQ 2590 POSITION 0,4:? "  z   ecf
       z          ecf     ";
AY 2600 ? "        ecf
     ecf      ";
BB 2610 ? "        ecf
     ecf      ";
```

```
HA 2620 ? " bodaaaoa              aaaaaa a
   aaaaoabod ";
LL 2630 ? " ecf
     ecf ";
LO 2640 ? " ecf
     ecf ";
UR 2650 ? " ecf          bodaagijaaaaaaaa a
   abod  ecf ";
BN 2660 ? " ecf        zecf  kil
   ecf  ecf ";
CG 2670 ? "aaoabod    ecf   kil
   ecf  boda";
SH 2680 ? "      ecf    ecf    kil    z
   ecf zecf ";
QR 2690 ? "     aoaaaaaoa    kil
   ecf  ecf ";
GN 2700 ? "                z kil
   ecf  ecf ";
PY 2710 ? "                  eil    aaaaaa
   aoaa ecf ";
MM 2720 ? "                  eil
     ecf ";
KU 2730 ? " bodaaaaaaaaaaaaghn
     ecf ";
EL 2740 ? " ecf          z   kil       z
   z  z ecf ";
VO 2750 ? " ecf            kif
     ecf ";
VR 2760 ? " ecf            kif
     ecf ";
BM 2770 ? " aoaaabodaa         aaaaaaaaaaa a
   a  bodaoa ";
SS 2780 ? "         ecf
   ecf";
AB 2800 REM *** PRINT CUBES ***
IL 2810 FOR WP=C1 TO C10:POSITION XC(SCR,
   WP),YC(SCR,WP):? CHR$(111+WP):NEXT WP
JO 2820 FOR WP=1 TO WL(SCR):POSITION XL(S
   CR,WP),YL(SCR,WP):? CHR$(C32):NEXT WP
DI 2830 IF SCR=1 THEN RETURN
OE 2840 ON SCR-C1 GOTO 2850,2880,2910,294
   0,2970
YK 2850 IF CC(1)=1 THEN POSITION 27,C18:?
   "i":POSITION C3,C7:? "h"
OY 2860 IF CC(2)=1 THEN POSITION 27,C11:?
    "i":POSITION 27,C7:? "h"
BL 2870 RETURN
RF 2880 IF CC(3)=1 THEN POSITION 30,C7:?
   "i":POSITION 30,C15:? "i"
BL 2890 IF CC(4)=1 THEN POSITION 30,C15:?
    "i"
AS 2900 RETURN
SC 2910 IF CC(5)=1 THEN POSITION C3,C12:?
    "h"
IC 2920 IF CC(6)=1 THEN POSITION C18,C7:?
    "i"
BB 2930 RETURN
YQ 2940 IF CC(7)=1 THEN POSITION C10,C7:?
    "i"
ZL 2950 IF CC(8)=1 THEN POSITION C10,C14:
   ? "i"
BK 2960 RETURN
NC 2970 IF CC(9)=1 THEN POSITION C17,C18:
   ? "h"
SF 2980 IF CC(10)=1 THEN POSITION C17,C10
   :? "i"
BT 2990 RETURN
AU 3200 REM *** INITIALIZING ***
ZX 3210 SCREEN=PEEK(106)*256-1080:DLI=SCR
   EEN-34:DLIHI=INT(DLI/256):DLILO=DLI-DL
   IHI*256:POKE 560,DLILO:POKE 561,DLIHI
HK 3220 SCRHI=INT(SCREEN/256):SCRLO=SCREE
   N-SCRHI*256:POKE 88,SCRLO:POKE 89,SCRH
   I
ET 3230 RESTORE 4110:FOR X=DLI TO DLI+33:
   READ B:IF B<0 THEN B=PEEK(ABS(B))
IR 3240 POKE X,B:NEXT X:C1=1:C2=2:C3=3:C4
```

```
   =4:C6=6:C7=7:C8=8:C10=10:C11=11:C12=12
   :C13=13:C14=14:C15=15:C16=16:C17=17
BI 3250 C18=18:C20=20:C32=32:C43=43:C46=4
   6
DN 3260 DIM PR$(C10),PL$(C10),PH$(C10),PT
   $(C10),PMOV$(100),PB$(C3),NAM$(28)
GV 3270 RESTORE 4010:MOVE=ADR(PMOV$):FOR
   X=C1 TO 100:READ N:PMOV$(X)=CHR$(N):NE
   XT X
FC 3280 FOR I=C1 TO C10:READ N:PR$(I)=CHR
   $(N):NEXT I
YH 3290 FOR I=C1 TO C10:READ N:PL$(I)=CHR
   $(N):NEXT I
SS 3300 FOR I=C1 TO C10:READ N:PH$(I)=CHR
   $(N):NEXT I
GR 3310 FOR I=C1 TO C10:READ N:PT$(I)=CHR
   $(N):NEXT I
LD 3320 FOR I=C1 TO C3:READ N:PB$(I)=CHR$
   (N):NEXT I
RX 3330 PMBASE=PEEK(106)-16:POKE 54279,PM
   BASE:PMB=PMBASE*256:PR=ADR(PR$):PL=ADR
   (PL$):POKE 53277,2
TW 3340 PH=ADR(PH$):PT=ADR(PT$):PB=ADR(PB
   $):POKE 704,44:POKE 705,126
HC 3345 FOR I=203 TO 209:POKE I,0:NEXT I
XQ 3350 AC=PEEK(106)-16:NCB=AC*256:POKE 2
   04,AC:POKE 206,224:POKE 712,1
TX 3360 RESTORE 4100:DIM CHM$(20):FOR X=C
   1 TO C20:READ B:CHM$(X,X)=CHR$(B):NEXT
    X
EK 3370 Q=USR(ADR(CHM$)):RESTORE 3490:FOR
    X=NCB+65*C8 TO NCB+91*C8-C1:READ B:PO
   KE X,B:NEXT X
LO 3380 FOR X=NCB+97*C8 TO NCB+123*C8-C1:
   READ B:POKE X,B:NEXT X
UP 3390 POKE 752,1:POKE 82,0:POKE 708,10:
   POKE 709,119:POKE 710,88:POKE 87,0:? C
   HR$(125)
PH 3400 FOR X=0 TO 39:POKE SCREEN+X,85:PO
   KE SCREEN+60+X,85:POKE SCREEN+120+X,85
   :NEXT X
ZM 3410 REM *** CUBE POSITIONS ***
UC 3420 DIM XC(C6,C10),YC(C6,C10),XL(C6,C
   10),YL(C6,C10),WL(C10),CC(C10)
RR 3430 FOR W=C1 TO C10:WL(W)=0:CC(W)=0:N
   EXT W
ZV 3440 RESTORE 4120:FOR W=C1 TO C6:FOR W
   P=C1 TO C10:READ CA,CB:XC(W,WP)=CA:YC(
   W,WP)=CB:XL(W,WP)=0
KD 3450 YL(W,WP)=4:NEXT WP:NEXT W
EU 3460 DIM BP(C6):FOR W=C1 TO C6:READ D:
   BP(W)=D:NEXT W
QT 3470 GOTO 30
MY 3480 REM *** DATA ***
SH 3490 DATA 63,51,3,3,3,3,3,15
WW 3500 DATA 252,204,192,192,192,192,192,
   240
HK 3510 DATA 63,60,60,60,63,60,60,60
NA 3520 DATA 252,60,60,60,252,48,60,60
PG 3530 DATA 15,3,3,3,3,3,3,15
ZN 3540 DATA 240,192,192,192,192,192,192,
   240
IX 3550 DATA 63,60,60,60,60,60,60,63
UQ 3560 DATA 252,12,0,0,0,0,12,252
JD 3570 DATA 60,60,60,63,63,60,60,60
NY 3580 DATA 12,60,240,192,192,240,60,12
KR 3590 DATA 60,60,60,60,63,3,3,15
XJ 3600 DATA 60,60,60,60,252,192,192,240
HD 3610 DATA 60,60,60,60,60,60,60,63
SG 3620 DATA 60,60,60,60,60,60,60,252
LN 3630 DATA 63,60,60,60,63,60,60,63
CP 3640 DATA 240,240,240,240,252,60,60,25
   2
PV 3650 DATA 252,12,0,0,240,0,12,252
DL 3660 DATA 63,60,60,60,63,0,48,63
MZ 3670 DATA 252,12,0,0,252,60,60,252
TD 3680 DATA 252,12,0,0,60,12,12,252
```

```
QQ 3690 DATA 252,12,12,12,252,12,12,12
KH 3700 DATA 63,51,51,48,48,48,48,48
CN 3710 DATA 252,204,204,12,12,12,12,12
SC 3720 DATA 252,12,12,12,12,12,12,252
RF 3730 DATA 60,60,60,60,60,60,15,3
AB 3740 DATA 12,12,12,12,12,60,240,192
VW 3750 DATA 85,65,65,85,0,0,0,0
DZ 3760 DATA 85,65,65,85,2,2,2,2
DK 3770 DATA 170,0,0,0,170,0,0,0
UZ 3780 DATA 85,65,65,85,128,128,128,128
MI 3790 DATA 2,2,2,2,2,2,2,2
FJ 3800 DATA 128,128,128,128,128,128,128,
   128
TU 3810 DATA 85,69,70,86,6,6,6,6
JT 3820 DATA 255,255,170,170,170,170,170,
   170
FG 3830 DATA 170,170,170,170,170,170,170,
   170
YS 3840 DATA 85,81,145,149,144,144,144,14
   4
IC 3850 DATA 6,6,6,6,6,6,6,6
OV 3860 DATA 144,144,144,144,144,144,144,
   144
HK 3870 DATA 5,5,6,6,6,6,6,6
RD 3880 DATA 80,80,144,144,144,144,144,14
   4
IJ 3890 DATA 85,0,0,85,0,0,0,0
XG 3900 DATA 255,255,255,243,255,255,255,
   0
UQ 3910 DATA 255,252,255,255,255,207,255,
   0
RX 3920 DATA 255,252,255,243,255,207,255,
   0
PH 3930 DATA 255,204,255,255,255,204,255,
   0
MO 3940 DATA 255,204,255,243,255,204,255,
   0
JY 3950 DATA 255,204,255,204,255,204,255,
   0
VC 3960 DATA 255,243,255,255,255,243,255,
   0
SM 3970 DATA 255,207,255,243,255,252,255,
   0
SM 3980 DATA 255,243,255,243,255,243,255,
   0
KG 3990 DATA 255,192,204,204,204,192,255,
   0
YX 4000 DATA 192,192,192,192,192,192,192,
   0
PJ 4010 DATA 216,104,104,104,133,213,104,
   24,105,4,133,206,104,133,205,104,133,2
   04,104,133,203,104,104,133,208
PZ 4020 DATA 104,104,133,209,104,104,24,1
   01,209,133,207,166,213,240,16,165,205,
   24,105,0,133,205,165,206,105
TS 4030 DATA 1,133,206,202,208,240,160,0,
   162,0,196,209,144,19,196,207,176,15,13
   2,212,138,168,177,203,164
LY 4040 DATA 212,145,205,232,169,0,240,4,
   169,0,145,205,200,192,0,208,224,166,21
   3,165,208,157,0,208,96
CL 4050 DATA 40,16,56,44,56,48,56,24,36,5
   4
MD 4060 DATA 10,4,14,26,14,6,14,12,18,54
RG 4070 DATA 36,24,60,60,102,60,24,24,36,
   102
CS 4080 DATA 36,24,24,44,52,60,60,24,24,6
   0
BQ 4090 DATA 15,15,15
YD 4100 DATA 104,162,4,160,0,177,205,145,
   203,200,208,249,230,206,230,204,202,20
   8,242,96
XO 4110 DATA 112,112,77,-88,-89,6,14,6,13
   ,112,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4
   ,4,4,4,4,65,-560,-561
DB 4120 DATA 1,4,29,4,23,9,10,9,5,19,38,9
   ,33,13,33,19,30,9,25,16
GN 4130 DATA 11,8,20,8,6,12,5,19,34,9,38,
   4,0,9,1,4,23,12,32,19
ZU 4140 DATA 8,9,3,9,3,19,18,12,38,16,18,
   17,3,4,27,4,25,8,38,9
HM 4150 DATA 23,19,22,14,37,14,1,9,33,9,1
   4,9,25,4,3,4,26,9,7,14
VZ 4160 DATA 1,9,1,14,17,8,28,15,34,15,38
   ,4,31,4,18,15,2,4,18,4
AY 4170 DATA 22,13,13,15,1,4,8,11,34,13,3
   0,19,23,19,33,19,10,19,21,4
GR 4180 DATA 100,116,92,164,132,156
```

```
EI 1 REM ****************************
XC 2 REM *  TRICKY CUBES LISTING 2   *
DM 3 REM *  'The Ultimate Challenge' *
EB 4 REM * ------------------------- *
QO 5 REM *   COMBINE WITH LISTING 1  *
UX 6 REM *      see article          *
EO 7 REM ****************************
MJ 630 ON SCR-C1 GOTO 640,680,720,760,780
TE 640 IF ZZ=118 THEN CC(1)=1:POSITION 31
   ,C16:? "i":RETURN
CD 650 IF ZZ=119 THEN POSITION 27,9:? "h"
   :RETURN
FY 660 IF ZZ=120 THEN CC(2)=1:POSITION C1
   1,9:? "h":RETURN
JD 670 POSITION C7,C16:? "i":RETURN
DI 680 IF ZZ=118 THEN POSITION C16,C12:?
   "i":POSITION C11,C7:? "h":RETURN
LB 690 IF ZZ=119 THEN CC(3)=1:POSITION 24
   ,C7:? "i":POSITION C11,C7:? "h":RETURN
BL 700 IF ZZ=120 THEN POSITION 24,C7:? "i
   ":POSITION C16,C12:? "h":RETURN
CJ 710 CC(4)=1:POSITION 24,C17:? "h":RETU
   RN
IQ 720 IF ZZ=118 THEN CC(5)=1:POSITION C1
   8,C7:? "h":POSITION 32,C13:? "i":RETUR
   N
QH 730 IF ZZ=119 THEN CC(6)=1:POSITION C1
   8,C16:? "i":RETURN
UM 740 IF ZZ=120 THEN POSITION 32,C13:? "
   i":RETURN
UK 750 POSITION 32,C13:? "h":RETURN
UX 760 IF ZZ=118 OR ZZ=121 THEN CC(7)=1:P
   OSITION 9,C13:? "h":RETURN
VB 770 CC(8)=1:POSITION 30,C7:? "h":RETUR
   N
IW 780 IF ZZ=118 OR ZZ=121 THEN CC(9)=1:P
   OSITION 30,C10:? "i":RETURN
WX 790 IF ZZ=119 THEN POSITION 9,C10:? "i
   ":POSITION 30,C10:? "h":RETURN
HO 800 CC(10)=1:POSITION 9,C10:? "i":RETU
   RN
VZ 1360 FOR W=C1 TO C6:Y=Y+C4:GOSUB 390:N
   EXT W:GOTO 60
UJ 1460 SCR=C1:SC=0:ANZ=9:TSC=0:TIM=4000
RR 1490 POSITION 0,C4:? "    ecf    z
     z                   z ";
AI 1500 ? "   ecf
          ";
AL 1510 ? "   ecf
          ";
DM 1520 ? " aaaoaaaaaa aaabod      bodaaag
   ijaaboda  ";
BY 1530 ? "                  ecf       ecf  k
   il  ecf    ";
CB 1540 ? "                  ecf       ecf  k
   il  ecf    ";
LB 1550 ? " bodabod  z       ecf       ecf  k
   il  aobod ";
VI 1560 ? " ecf ecf          aoaaaaaaaoa    k
   il   ecf ";
YS 1570 ? " ecf ecf                         k
   il   ecf ";
```

```
MW 1580 ? "aaoa aoaaaa          k
   il bodaoaa";
CS 1590 ? "     z      z    z  k
   il ecf    ";
EC 1600 ? "
      ecf    ";
EF 1610 ? "
      ecf    ";
ZK 1620 ? " bodaa       aaaaaaagijaaaaabod
   aaaaoa    ";
HZ 1630 ? " ecf           kil      ecf
             ";
XF 1640 ? " ecf  bodaa    z  kil  z  ecf
        z ";
JY 1650 ? " ecf  ecf                aob
   od        ";
FC 1660 ? " ecf  ecf                 e
   cf        ";
BV 1670 ? " aobodaoa    aaaa  aaaaaaa   a
   oaaabodaa ";
JS 1680 ? "     ecf
      ecf";
IK 1690 GOSUB 2800:RETURN
IW 1700 REM *** SCREEN 2 ***
YE 1710 POSITION 0,C4:? " zecf
   z                 ecf  z";
LJ 1720 ? "   ecf
      ecf    ";
LM 1730 ? "   ecf
      ecf    ";
BD 1740 ? " aaaoabod      bodaa aabod
   bodaoaaa ";
NM 1750 ? "       ecf      ecf      ecf
      ecf    ";
PT 1760 ? "         aoaagijaaoa      aoaagija
   aaoa    ";
CI 1770 ? "  z      kil     z       z  kil
        z ";
QX 1780 ? "         kil               kil
             ";
RA 1790 ? "         kil               kil
             ";
XU 1800 ? "abod      kil  aaaa aaaa  kil
   bodaaa";
VM 1810 ? " ecf
      ecf    ";
VP 1820 ? " ecf
      ecf    ";
XA 1830 ? " aoaaaghjaaaabod        bodaaa
   ghjaaoa   ";
5H 1840 ? "       kil      ecf      ecf
   kil       ";
SK 1850 ? "       kil      ecf
   kil       ";
OB 1860 ? "   z  kil  bodoa  z  aobod
   kil     z ";
EC 1870 ? "           ecf        ecf
             ";
EF 1880 ? "           ecf        ecf
             ";
LV 1890 ? " aabodaaa   aoaaaaaa aaaaaaoa
   aaaabodaa ";
JA 1900 ? "   ecf
      ecf";
HS 1910 GOSUB 2800:RETURN
KB 1920 REM *** SCREEN 3 ***
VG 1930 POSITION 0,C4:? "   ecf
   z                 ecf  z";
LT 1940 ? "   ecf
      ecf    ";
LW 1950 ? "   ecf
      ecf    ";
YA 1960 ? " bodoaa  aagijaaaaaaaaghjaaaa
   aaaaaoaaa ";
PR 1970 ? " ecf       kil        kil
        z    ";
FI 1980 ? " ecf      kil   z     z kil
                                   ";
KE 1990 ? " ecf          kil
              ";
VC 2000 ? " ecf           kif   bo
   dabodabod ";
ZY 2010 ? " ecf   aaaaaaaghjaaa  kif  ec
   f ecf ecf ";
TG 2020 ? "aaoa          kil   mijaaao
   a ecf aoaa";
SY 2030 ? "              z   kil  z kil
      ecf    ";
LB 2040 ? "      z           kif   eil
      ecf        ";
SC 2050 ? "                   kif  eil  bo
   daaobod  z";
NB 2060 ? "              abod aaaaaaaagin  ec
   f     ecf     ";
XM 2070 ? " bodaaa        ecf          kil  ec
   f     ecf ";
VZ 2080 ? " ecf           ecf    z   kil  ec
   f     aobod ";
LF 2090 ? " ecf           ecf              ec
   f     ecf ";
KG 2100 ? " ecf           ecf              ec
   f     ecf ";
HS 2110 ? " aobod  aaaaoaaaaaaaaaaaaaaaaaao
   a     bodoa ";
IR 2120 ? "      ecf
      ecf";
HJ 2130 GOSUB 2800:RETURN
KN 2140 REM *** SCREEN 4 ***
PL 2150 POSITION 0,C4:? "  ecf        z
             z   ecf  z";
LK 2160 ? "    ecf
      ecf    ";
LN 2170 ? "    ecf
      ecf    ";
HN 2180 ? " bodoa  z bodaaagijaaaa  aaaaa
   a    aobod ";
QF 2190 ? " ecf      ecf    kil  z
      ecf    ";
LY 2200 ? " ecf        ecf    kil
      ecf    ";
MB 2210 ? " aoaabodaaaoa   z kil
      z    ecf ";
NW 2220 ? "            ecf      kil aaa
      ecf ";
PM 2230 ? "    ecf              kil
      ecf ";
VW 2240 ? "abodaaoa    boda         bod
   aghjaaaoaa";
RN 2250 ? " ecf        ecf          ecf
      kil  z      ecf ";
RW 2260 ? " ecf        ecf          ecf
      kil  ecf    ";
RN 2270 ? " aoaabod    aobodaghjaaa   ecf
      kil       ";
FF 2280 ? "         ecf     ecf kil    ecf
      kil  abod ";
HQ 2290 ? "       ecf      ecf kil     aaaoa
      kil  ecf ";
FY 2300 ? " bodaaoa   zbodoa kil  z
      kil  ecf ";
NP 2310 ? " ecf         ecf   kif
      ecf ";
NS 2320 ? " ecf         ecf   kif
      ecf ";
GD 2330 ? " aobodaaaaaoa     aaaaaa  aaaaa
   aaaabodoa ";
JB 2340 ? "   ecf
      ecf";
HT 2350 GOSUB 2800:RETURN
LS 2360 REM *** SCREEN 5 ***
ML 2370 POSITION 0,C4:? "  zecf
             z         ecf  z";
LU 2380 ? "   ecf
      ecf    ";
```

```
LX 2390 ? "   ecf
        ecf  ";
BH 2400 ? " aaaobod       zboda aaaaaaaaag
   ijaaaobod ";
WZ 2410 ? "   ecf        ecf           k
   il   ecf ";
XC 2420 ? "   ecf        ecf           k
   il   ecf ";
AI 2430 ? "  z  ecf    aaaoa  aaaabod  zk
   il  bodoa ";
AU 2440 ? "   ecf                ecf   k
   il  ecf   ";
AX 2450 ? "   ecf                ecf   k
   il  ecf  ";
PB 2460 ? "abod aoagijaaaaaaa     zaoaaa k
   il  aoaaaa";
IK 2470 ? " ecf    kil                 k
   il       ";
EV 2480 ? " ecf    kil                 k
   il  z    ";
LX 2490 ? " aobod  kil  zboda aaaa    z k
   il       ";
FS 2500 ? "   ecf  kil   ecf           k
   il       ";
CG 2510 ? "   ecf  kil   ecf           k
   il  aabod ";
JW 2520 ? " bodoa  kil aaaoa  aabodaaaa k
   il   ecf ";
XA 2530 ? " ecf                  ecf
        ecf ";
XD 2540 ? " ecf                  ecf
        ecf ";
MK 2550 ? " aobodaaaaaaaaaaaa   aoaaaaaaa
   aaaabodoa ";
JL 2560 ? "   ecf
      ecf";
ID 2570 GOSUB 2800:RETURN
MX 2580 REM *** SCREEN 6 ***
TT 2590 POSITION 0,C4:? "  zecf
           z      ecf  z";
LC 2600 ? "   ecf
      ecf  ";
LF 2610 ? "   ecf
      ecf  ";
CO 2620 ? " bodoa        zbodaa  abodaaaaa
     zaobod ";
XJ 2630 ? " ecf            ecf   ecf
        ecf ";
XM 2640 ? " ecf            ecf   ecf
        ecf ";
WO 2650 ? " aoaaaaaghja ecf      ecf    ag
   hjaaaaaoa ";
LE 2660 ? "        kil  ecf      ecf    k
   il       ";
BI 2670 ? "        kil  ecf   aaaoa     k
   il       ";
OF 2680 ? "abod  z kil  ecf z          z k
   il   zboda";
JO 2690 ? " ecf    kil  ecf             k
   il   ecf ";
IP 2700 ? " ecf    kil  ecf             k
   il   ecf ";
EY 2710 ? " aoaaa  kil  aoaa  aaaaabod  k
   il  aaaoa ";
VD 2720 ? "        eil              ecf k
   if       ";
VG 2730 ? "        eil              ecf k
   if       ";
WZ 2740 ? " bodaaaaaaa      z    bodaoa a
   aaaaaabod ";
XK 2750 ? " ecf                  ecf
        ecf ";
XN 2760 ? " ecf                  ecf
        ecf ";
MU 2770 ? " aobodaaaaaaaaaaaa   aoaaaaaaa
   aaaabodoa ";
JV 2780 ? "   ecf
```



```
      ecf";
CF 2850 IF CC(1)=1 THEN POSITION 31,C16:?
   "i"
YB 2860 IF CC(2)=1 THEN POSITION C11,9:?
   "h"
FM 2880 IF CC(3)=1 THEN POSITION 24,C7:?
   "i":POSITION C11,C7:? "h"
GJ 2890 IF CC(4)=1 THEN POSITION 24,C17:?
   "h"
WA 2910 IF CC(5)=1 THEN POSITION C18,C7:?
   "h":POSITION 32,C13:? "i"
LE 2920 IF CC(6)=1 THEN POSITION C18,C16:
   ? "i"
DL 2940 IF CC(7)=1 THEN POSITION 9,C13:?
   "h"
BN 2950 IF CC(8)=1 THEN POSITION 30,C7:?
   "h"
WR 2970 IF CC(9)=1 THEN POSITION 30,C10:?
   "i"
MS 2980 IF CC(10)=1 THEN POSITION 9,C10:?
   "i"
FF 4120 DATA 9,4,17,4,37,4,9,10,5,14,16,1
   4,24,14,15,19,37,19,23,19
GT 4130 DATA 1,4,38,4,16,10,22,10,1,19,37
   ,19,17,19,1,10,37,10,21,4
YK 4140 DATA 20,14,20,9,4,15,32,8,38,16,1
   0,14,38,4,15,4,14,9,18,19
ME 4150 DATA 29,4,21,8,7,7,14,10,21,19,9,
   19,30,10,38,4,13,4,35,14
PH 4160 DATA 1,4,1,10,25,4,38,4,27,10,21,
   13,12,7,12,16,34,15,26,16
KV 4170 DATA 1,4,38,4,11,7,32,7,26,13,14,
   19,5,13,27,4,34,13,16,13
SZ 4180 DATA 88,120,72,140,116,116
```

GOTO DIRECTORY

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First Steps

Another look at WRITE A GAME plus some problems

Cliff Winship from Gloucester has been a real eager beaver since 'WRITE-A-GAME' appeared. I have included his routine to allow the computer to choose and play. The first thing that I noted was that he had read my article on Boolean algebra (issue 10) and included a sample in line 10020. He also made use of the ON GOTO routine instead of separate lines using the IF statement (line 10030).

Unfortunately no-one seems to have tried the 'homework', i.e. storing previous choices and comparing them. Cliff used a random routine which will work well but will not give an intelligent game. So, in an effort to elicit some reader response I will offer a tutorial tape to the person who comes up with the best answer to this problem **by 18th July**. I would ask that the more experienced programmers leave this little problem to the novices, after all this is their column! Failing all this I guess I will just have to rack my brains and come up with some sort of solution - sigh!

Tape Problems

I noticed in issue 21 that Nick from South Wirral had a faulty 410. I would like to suggest some possible remedies for similar 410's (or 1010's, or even XC's!). The most common cause of tape failure concerns the read/write heads. These tend to pick up airborn dust and grease as well as the usual ferric dust from the tapes. This is easy to cure - just give them a wipe with a soft cloth or cotton bud soaked in a proprietary degreaser and then wipe dry. Make sure the cotton bud is not held on with adhesive! When my brother worked for Grundig he used carbon tetrachloride as a cleaner. This is carcinogenic (cancer causing) and is now banned, so be careful what you use and always wash your hands afterwards. At a pinch, he used lighter fuel - the aerosol variety! The heads can be cleaned more easily by opening the lid, pushing the little silver lever at the left rear of the tape compartment and pressing the PLAY button to extend the head platine.

Tape heads sometimes tend to hold magnetic flux (becoming a magnet and thus corrupting tape data). Manufacturers deny this with modern materials, but it is known to happen - why else can you buy de-gaussers? The de-gausser, a device used to remove the flux, can be a hand held device or come in the shape of a cassette. They can be borrowed from some hi-fi libraries, but they are cheap. If you know anything about the Philadelphia Experiment please do not panic, de-gaussing is not so cataclysmic!

The last item is seldom mentioned but is a contributing factor. The 410 is belt driven and the belt will age and stretch over a period of years. Belt slippage causes speed fluctuations and will make the tapes unreadable. Belts are only a few pence from most hi-fi or electronic shops (e.g. Maplin).

Drive Heads

I was recently asked by Stan Fallaize to recommend a good drive head cleaner. This is a real controversial subject, and whoever you talk to will have a different opinion on it. Although the drive head is extremely close to (but not touching) the disk and therefore not picking up ferric residue as will a tape head, the casing is open to airborn intrusion of dust, grease and other 'invaders'. I believe that the use of a wet cleaner applied for a few seconds, once a month, will not go amiss. The only bad bit is the dreadful 'snarking' noise your drive will make when it looks at the cleaning disk as, unforunately, ATARI drives do not have a cleaning cycle. *(Just to confuse you, I have never cleaned the heads on my drives and they probably get ten times more use than most people's do! Ed.)*

To end this bout of spring cleaning I would recommend that the edge terminations of cartridges be cleaned with a liquid and soft cloth. Do not use anything abrasive with the contacts, they are gold coated to stop contamination and corrosive welding. My ATARIWRITER cartridge will sometimes do wierd things and dirty edge connectors are the cause.

Bugs

As an aside, do you know the origin of the words 'bug' and 'debug'? Well, when computers were in their infancy they were room sized and had to be very well ventilated. This left them open to various small insects which crawled or flew into the computer, landing on terminals and causing short circuits. Every so often the engineers had to go inside the computer and dust out these bugs. Fascinating stuff!

I look forward to some hints about future editions of this column, as well as answers to the above problem. Don't forget you can always write to me at **P.O.Box 123, Belfast, BT10 0DB**

by Mark Hutchinson



FIRST STEPS listing

```
PP 9 REM *** Computer playing.
KI 10000 ? "My turn - genius at work!!"
VJ 10010 C=INT(RND(0)*63)+1
DR 10020 U=(C=63)+2*(C=21)+3*(C=18)+4*(C=
   58)+5*(C=42)+6*(C=56)+7*(C=61)+8*(C=57
   )+9*(C=13)
IR 10030 ON U GOTO 10050,10060,10070,1008
   0,10090,10100,10110,10120,10130
WL 10040 GOTO 10010
GF 10050 LOCATE 8,3,N:IF N<>216 THEN IF N
   <>239 THEN POSITION 8,3:? #6;O$:RETURN
CQ 10060 LOCATE 10,3,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 10,3:? #6;O$:RETU
   RN
IQ 10070 LOCATE 12,3,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 12,3:? #6;O$:RETU
   RN
MP 10080 LOCATE 8,5,N:IF N<>216 THEN IF N
   <>239 THEN POSITION 8,5:? #6;O$:RETURN
JG 10090 LOCATE 10,5,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 10,5:? #6;O$:RETU
   RN
NV 10100 LOCATE 12,5,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 12,5:? #6;O$:RETU
   RN
RO 10110 LOCATE 8,7,N:IF N<>216 THEN IF N
   <>239 THEN POSITION 8,7:? #6;O$:RETURN
OL 10120 LOCATE 10,7,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 10,7:? #6;O$:RETU
   RN
UL 10130 LOCATE 12,7,N:IF N<>216 THEN IF
   N<>239 THEN POSITION 12,7:? #6;O$:RETU
   RN
WO 10140 GOTO 10010
```

□

13. Dragon Quest and Stonequest

I estimate that there are close to two hundred Adventures available for the Atari. These range from simple BASIC listings in books and magazines through to multi-disk, machine language epics. Needless to say, the quality varies from lousy through to excellent with price usually being indicative of quality. Fortunately for Atari owners, very few Atari Adventures fall into the 'lousy' category, but those in the 'excellent' category tend to be a bit pricey.

Once in a blue moon, you find something out of the ordinary. Something that really makes you sit up and pay attention. Something that's cheap, yet holds its own with the most expensive commercial Adventures. Dragon Quest and Stonequest are two such Adventures. If you've never heard of them before, then I'm not surprised. These Adventures cannot be bought over the counter at your local computer store. They are only available by mail order from the U.S.A. and hence are not very well known - although they deserve to be. Both are top quality games. Buy them if you can. I doubt that you'll be disappointed.

DRAGON QUEST
or
A Twist in the Tail

Dragon Quest is an illustrated Adventure written in BASIC and machine language by Ed Churnside. It is just one of the many fine programs available from the APX Classics in Antic magazine's software catalogue. Unfortunately, it is the only Adventure.

The game comes on a double-sided disk. You should begin by booting side 2 as this contains all the instructions. You will be given the option of printing the instructions to the screen or a printer. Choose the printer option if you've got one as the instructions are very lengthy - certainly too much to remember in one sitting. They give a brief overview of the game, system requirements, loading instructions, very thorough playing instructions, technical notes, game playing hints and three appendices. It's a pity that instructions for all commercial Adventures aren't this thorough. The playing instructions make it obvious that the author has put a lot of effort into making the game easy to use. For example, you can save up to ten games on each data disk and this can be on a second drive to avoid disk swaps. You can format a disk or get a directory of the saved games and free space available from within the game, you can keep a record of your quest on a printer (a la Infocom) and even toggle the custom character set on and off (a la Scott Adams).

As if that's not enough, the author even has an answer to the 'sudden death syndrome' common in many Adventures. When you carry out some action that causes your demise, you may be offered a second chance. The program asks "Would you like to try that again?". If you answer "YES", you can continue on from the previous move as though nothing had happened. Great stuff! When you've finished with the instructions, flip the disk to side 1 and boot the main program.

Dragon Quest begins in a forest. Isn't it amazing how many Adventures start in a forest? I often wonder how you got there in the first place. Anyway, this particular forest and all subsequent locations are depicted by brightly coloured pictures in GRAPHICS 7. The resolution of GRAPHICS 7 is a little coarser than what you're probably used to in an illustrated Adventure, but it doesn't detract from the game. The pictures have been drawn using Paint (Reston/Atari) and Draw It! (APX/Antic), and have been saved in a compacted format so that they load very quickly. But back to the game...

It just so happens that a sign is roped to a nearby tree in the forest. Upon reading the sign, you find that the king is offering a large reward for some unspecified task. Now being the adventurous type (money hungry?), you set off to see the king for more details. When you find him, he reveals that he and the princess were once hunting in the forest when they became separated from the main party. Whilst wandering about by themselves, a dragon swooped down and carried the princess away. The king knows that the princess is dead, but wants you to find and kill the dragon and return with the princess' pendant as proof of your success. Only then will he give you your reward. However, he is good enough to give you 500 gold pieces to use in your quest.

Now that your aim is clear, you can set off and explore the castle and the forest and anything else that pops up along the way. Note that important items are sometimes shown in the picture, but not in the description and vice versa, so examine everything! Be careful in the forest. It is in fact a maze, but one worth exploring. Read the room descriptions carefully as each one is unique.

The game is absolutely riddled with hints and humour, but it's sometimes hard to distinguish between the two. It is sometimes only in retrospect that you realise a humourous line was actually a subtle clue. Therefore, don't take anything for granted. And don't be shy! Talk to anyone and everyone...and listen too! Most importantly, this game is very logical. There is a reason for everything and nothing is random!

Dragon Quest comes close to the perfect blend of inbuilt clues, interesting puzzles, humour and downright fun. It even has an element of mystery that I've never struck before in an Adventure. Just like an Agatha Christie novel, there is a twist in the ending, hence the sub-title "A Twist in the Tail". There's even a twist in the sub-title! (Say it out loud and ignore the spelling. Get it?) I did find a couple of minor bugs, but even these were humourous. Can you imagine my surprise when a certain save/restore sequence gave me a picture of a dragon superimposed over the king?

Finally, just to top everything off, a successful completion of the game rewards you with a completely unexpected surprise. I won't reveal the surprise, but it did induce a great feeling of pride and achievement unlike anything I'd experienced with

by Garry Francis of Sydney, Australia

other Adventures. I'm just sorry that it's over. A sequel was mentioned in the instructions of another APX Classic called Draw It! Let's hope this comes to fruition. Anyway, if you want a refreshingly different Adventure with just the right level of difficulty, try Dragon Quest. It's the best game I've played for ages.

Dragon Quest costs just US$12.95 plus US$6.00 for return airmail postage. You can pay using VISA, Mastercard or an international cheque in U.S. dollars payable at a U.S. bank. Send your order to Antic Product Catalog, 524 Second Street, San Francisco, CA 94107, U.S.A.

STONEQUEST
or
The Quest for the Great Stone of Prosperity

Stonequest is an all-text Adventure written by David Strelitz. It is again written in BASIC which proves that this language is more than adequate for a fast executing, complex Adventure when placed in the hands of a competant author.

The six double-spaced pages of instructions for Stonequest are nowhere near as thorough as those for Dragon Quest, but adequate just the same. They consist of a title page, a lengthy background story and helpful playing instructions. The background story tells how a struggling alchemist created a stone that magically gave prosperity to whoever owned it. He gave this to the king of Parnidell, hoping that the kingdom would prosper. And it did. Unfortunately, the king did not give credit to the alchemist, but claimed that he'd invented the stone himself. The alchemist became angry and bitter and soon turned to evil. When the king died, his son Weesey took over the throne. Weesey was a good king, but "not well endowed in the brains department". The alchemist was able to trick Weesey and steal back the stone. Without the stone, prosperity left the kingdom and "the Parnidell stock market crashed". King Weesey summoned the greatest adventurers in the land to try and recover the Great Stone of Prosperity (as it had become known), but none were successful. In desperation, he offered "the greatest reward imaginable" for the recovery of the stone and this is where you enter the picture.

Stonequest is actually three games in one. When you first boot the disk, you are presented with a simple title screen which asks you to enter a codeword or press RETURN. The first time you play the game you won't know any codewords, so just press RETURN. However, when you later complete part 1, you will be given a codeword which you should write down for future reference. It will disappear when part 2 has finished loading. Whenever you reboot the disk, you can enter this codeword to skip directly to part 2 without having to replay part 1. Similarly, when you complete part 2, you will be given another codeword which allows you to skip directly to part 3. This is a novel idea which not only works well from the user's point of view, but no doubt allowed the author to squeeze a lot more Adventure out of the machine than would normally be possible in a single BASIC program.

Part 1 starts outside the royal palace. From here, you can explore the countryside of Parnidell including the forest (not another one!) and the township of Gree. There aren't many locations, but the descriptions are very lengthy and full of atmosphere. Once you've mapped the area and found the only object lying around, you may be left wondering what to do next. I should warn you that magic is commonplace in this kingdom. The puzzles you need to solve and the objects needed to solve them are very cleverly concealed all around you. Give it some thought and you'll find that the solution to part 1 is actually fairly easy. The last puzzle very cunningly forces you to drop all objects so that you can squeeze through a trapdoor. This leaves you empty handed when you start part 2.

Part 2 is set completely underground. Here you will meet two particularly nasty characters and some equally nasty puzzles. Magic again comes to the fore in more ways than one. At one point you find a small metal canister. If you pick it up and repeat your actions, you find another metal canister. If you take one of them to another room, then return and again repeat your actions, you'll find yet another metal canister! Ad infinitum. A cynic would say there's a bug in the program, but I know magic when I see it! Anyway, with a little persistance, you'll eventually find the whirlpool hinted at in the game's instructions and get sucked into the third and final part of the game.

Boy, this game gets harder and harder! Part 3 is set "on a dark and foreboding island". The dominant feature is a huge maze. It's really easy to map as all exits obey the laws of real life physics instead of Adventure physics, but it's HUGE... almost 200 rooms! Make sure you map it all or you may miss some important items. The closing chapters of the game include some more magic and a couple of riddles before entering the Black Fortress for the final showdown with the Evil Alchemist and (hopefully) the recovery of the Great Stone of Prosperity. Phew!

Stonequest is another great game for the price. It's a bit harder than Dragon Quest, but takes an equally light-hearted and humourous approach which makes it all the more enjoyable. If you like text Adventures, give Stonequest a go!

Stonequest costs US$14.95 plus US$4.00 for return airmail postage. It is available from LotsaBytes, 15445 Ventura Boulevard, Suite 10G, Sherman Oaks, CA 91413, U.S.A. Unfortunately, LotsaBytes will not accept credit cards, so you'll have to send an international cheque in U.S. dollars payable at a U.S. bank. *(You can obtain an International Money Order at any branch of Barclays. Ed.)* I notice that LotsaBytes haven't had their usual advertisements in recent issues of Antic and ANALOG, so you might be well advised to write a letter before sending any money, just to make sure they're still in business.

Next Issue

I haven't made any firm plans for next issue although I'm tentatively thinking of a trip to outer space. I've completed several Adventures recently, but most of them are the sort of rare and obscure titles (like Dragon Quest and Stonequest) that I really relish, yet most people haven't heard of. As usual, if you've got any criticism, comments or suggestions for future columns, feel free to contact me at the address below.

Finally, my thanks to our regular Adventure reviewer, John Sweeney, for helping me out with Asylum (Issue 20). Your free disk of Adventures is on the way!

Garry Francis
c/o Atari Computer Enthusiasts (N.S.W.)
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HINTS overleaf

Garry Francis' ADVENTURE HINTS

DRAGON QUEST:

1. Can't enter the castle?
35 50 11 43

2. Don't know whether to trust the king?
35 50 11 43 35 33 11 36 22 31 4 17 58

3. Can't enter the inn?
67 47

4. Can't find the wizard's hat?
22 31 4 17 58

5. Still can't find the wizard's hat?
70 49 11 66 11 43

6. Don't know whether to trust the king?
64 34 12 11 7 18 31 2

7. Can't open the door to the dungeon?
22 30 4 17 58

8. Can't leave the castle without falling into the moat?
68 23 67 65 51 22

9. Don't know whether to trust the king?
16 34 9 11 43

10. Objects disappear when you drop them?
22 31 4 17 58

11. Can't find the disappearing objects?
70 49 11 66 11 43

12. Can't climb the tree?
45 29

13. Can't go west from certain forest areas without being killed?
22 32 4 17 58

14. Still getting killed?
45 42

15. Can't see in the cave?
64 34 41

16. Missing wood?
27 43

17. Missing flint?
57 34 56 28

18. Missing steel?
57 34 7 28

19. Who or what is Durin?
22 32 4 17 58

20. Can't get gold to Durin?
62 1

21. Missing a shield?
39 15 17 58

22. Haven't found the woodland shrine?
35 33 11 36

23. Still haven't found the woodland shrine?
54 4 34 58 37

24. Still haven't found the woodland shrine?
52 46 44 11 3 28

25. Can't cross the stream?
45 61 31

26. Can't enter the woodland shrine?
10 19

27. Can't open the safe?
15 28 25 28 40 28 24 58 28

28. Can't decipher the third scroll?
13 40 48 63

29. Still can't decipher the third scroll?
31 38 59 26

30. Can't get the shield out of the shrine?
62 21 11 6

31. Can't enter the pit?
24 50 11 43 28

32. Can't untie the rope?
62 53

33. Missing a sword?
22 32 4 17 58

34. Can't find your way IN through the maze of tunnels?
35 33 11 36

35. Troll kills you?
62 23 53

36. Missing a magic sword?
16 34 60 8

37. Can't afford the magic sword?
27 69

38. Can't cross the lava flow?
10 9 11 43

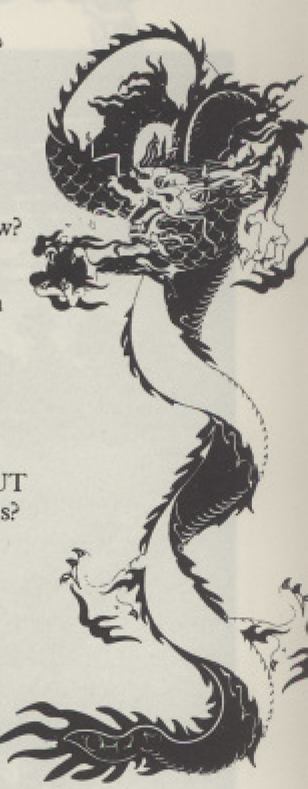
39. Still can't cross the lava flow?
5 14

40. Can't find the dragon?
24 20 11 56 28

41. Can't find your way OUT through the maze of tunnels?
35 33 11 36

42. Goblins kill you?
70 55 10

43. King throws you in the dungeon?
16 34 26



1	SHIELD	19	WIZARD	37	KEEPER	55	CAN
2	MOVE	20	SCROLLS	38	WORD	56	SHRINE
3	WELL	21	GAP	39	BUY	57	BEEN
4	BEER	22	DRINK	40	LETTERS	58	INN
5	RUB	23	MAGIC	41	SKULL	59	IS
6	GATE	24	REMEMBER	42	VALUABLES	60	DURIN
7	DUNGEON	25	NUMBERS	43	FOREST	61	EVERYTHING
8	AGAIN	26	DRAGONS	44	COINS	62	USE
9	WOMAN	27	SEARCH	45	DROP	63	SYMBOLS
10	HELP	28	?	46	ARE	64	LISTEN
11	IN	29	WEAPONS	47	CASTLE	65	OR
12	DOOR	30	THIRD	48	FOR	66	TREE
13	SUBSTITUTE	31	FIRST	49	LIVES	67	EXIT
14	POTION	32	SECOND	50	SIGN	68	FIND
15	WINE	33	POSTERS	51	DON'T	69	ROCKS
16	TALK	34	TO	52	WHY	70	MAGPIE
17	AT	35	READ	53	SWORD		
18	ON	36	COURTYARD	54	GIVE		

STONEQUEST:

PART 1:

1. Can't get past the mad lumberjack?
1 24 46 13

2. Can't find anything to trade with Ibid?
3 6 12 64 53 51

3. Still can't find anything to trade with Ibid?
3 65 37 3 66 20

4. Can't find anything to trade with Ivan?
8 64 69

5. Haven't found the trapdoor?
33 33 10 7 22

6. Can't open the trapdoor?
19 45 67 1 68 48 58 15 47 21

PART 2:

7. Can't make sense of the inscription?
5 1 64 25 34

8. Can't get the knife?
5 1 62

9. Still can't get the knife?
41 45 30 55

10. Still can't get the knife?
41 25 34 70 31 66 22

11. Can't open the bird cage?
36 43 3 59 35 5 13

12. Can't get past the ogre?
54 5 49

13. Can't get past the octopus?
41 3 59 39

14. Can't keep the matchey dry?
41 29 3 40

15. Can't find anywhere else to go?
44 1 50 13

PART 3:

16. Want a quick way out of the maze?
30 3 18

17. Can't find anywhere else to go?
27 42 15 17

18. Can't answer Ethnor's first riddle?
60 56 26 32 52 38

19. Can't answer Ethnor's second riddle?
9 1 45 11 63 22 1 45 16

20. Missing a gold coin?
41 3 42 17

21. Still missing a gold coin?
69 2 28 64 57 14

22. Can't read the tapestry?
8 64 69

23. Can't open the great wooden doors?
41 4 49

24. Can't defeat the Evil Alchemist?
41 3 42 17 58 15 61 46

25. Can't find anywhere else to go?
41 29 3 23



1	IS	25	MAGIC	49	SOMETHING
2	POTION	26	EYES	50	FLAMMABLE
3	THE	27	HERE'S	51	EGG
4	READING	28	FOR	52	AND
5	IT	29	MOVING	53	PRECIOUS
6	BIRD	30	USE	54	GIVE
7	SILVER	31	CENTRE	55	MAGNET
8	HAVE	32	MOUTH	56	OF
9	SUN	33	BANG	57	MIDAS
10	MAXWELL'S	34	WORD	58	IF
11	DAY	35	DO	59	OGRE
12	HAS	36	HOW	60	THINK
13	?	37	HAD	61	ARE
14	TOUCH	38	NOSE	62	METAL
15	YOU	39	FIRST	63	AS
16	NIGHT	40	RUBBLE	64	A
17	WELL	41	TRY	65	LUMBERJACK
18	PARCHMENT	42	WISHING	66	RIGHT
19	KEY	43	DOES	67	THIS
20	IDEA	44	WHAT	68	EASILY
21	PEACE	45	TO	69	DRINK
22	...	46	HUNGRY		
23	FURNITURE	47	DIG	70	TOP
24	HE	48	FOUND		

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SHORT REVIEWS



Jim Short reviews some recent releases

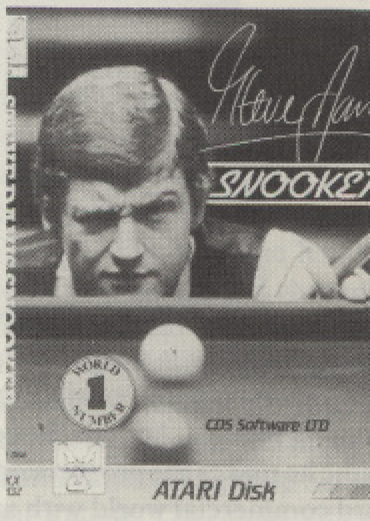
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1 Player
Joystick

Of all the sports which have been turned into computer simulations, snooker has to be the most unrealistic conversion of the lot. I've seen several versions on different micros and, to be honest, they're as true to life as an episode of the 'A-Team'. However, if you're a snooker fanatic and in the market for a computer version of your favourite sport then this first-time Atari release from CDS is the one to buy. It's even endorsed by Steve Davis (not exactly the best of recommendations when you consider the way he played against Joe Johnson recently!), which probably means that he pockets his fair share of the royalties!!

A good way to assess the game is by comparing it with the old Thorn-Emi version which was re-released a couple of months ago as part of their 'Spot the Ball' package. Both are reasonably similar but the CDS game has a number of additional features which gives it the edge over it's only other Atari rival.

Firstly, the table is black. Yes, I know what you're thinking - someone please tell this idiot that snooker tables are green. Whilst this is unquestionably true, it doesn't alter the fact that, where computer snooker is concerned, a black table makes for greater clarity, improved colours and enhanced definition. Simply compare the two versions - green of Thorn-Emi against black of CDS - and you'll see what I mean. Anyway, what's wrong with being King of the *black* baize for a change?

The CDS game also offers a greater



variety of changeable parameters such as table speed and cue-ball spin. All moves are via the joystick. You line up a small target cursor on the object ball, set the desired spin and power of shot before letting fly with the firebutton. After that you hope for the best. If a ball drops in the pocket, nine times out of ten it's more by luck than by design. Of course, that magical 147 maximum break is at least possible in theory, but in practice it's about as likely as Alex Higgins refusing a free gin & tonic (I've already upset the Steve 'Interesting' Davis fans, so I may as well even things up by upsetting the Hurricane Higgins fans as well!). In more realistic terms you can consider yourself World Champion if you manage to pot three balls in a row!

Normal snooker rules apply and you can even force your opponent to play again if a 'foul shot' is committed. Due to obvious limitations the 'Free Ball' rule is not implemented though.

Incidentally, just in case you were wondering, the black ball has a white circle around it to help distinguish it from the table, but this is also true of the green ball in the Thorn game.

STEVE DAVIS SNOOKER can be played against a computer or human opponent, with selectable skill levels for the computer. If you so desire, you can choose a double computer option and sit back and watch Steve Davis play himself. At the highest skill level the breaks are likely to approach treble figures with some totally unbelievable shots taking place - impossible doubles, playing off the cush first to pot the object ball which the likes of Jimmy White wouldn't attempt, let alone Steve Davis! Yes, the computer does cheat!!

In the words of a certain popular lager ad - STEVE DAVIS SNOOKER ...... probably the best snooker game in the world (or Great Britain at least). Me? I still think it looks and plays more like a game of marbles.

THE LAST V-8
Mastertronic
48K cassette
£2.99
1 Player
Joystick



Caught on the surface of a nuclear devastated planet you have seconds to return underground before your radiation shield decays. In any other car you would stand no chance - in the LAST V-8 survival is possible...... Maybe!

Okay, that takes care of the sales hype on the cassette inlay, now let's get down to facts. Despite Mastertronic's dynamic build-up which makes the LAST V-8 sound like an introduction to the latest Mad Max movie, it's actually another driving game (of sorts) similar to

Adventure International's 'Rally Speedway'.

The screen view is a plan view looking down on the action from above and the general idea is to try and guide a tiny car along a narrow road, heading for base. The road starts off straight enough but, inevitably, begins to twist and turn in erratic fashion almost before you've managed to get the car into it's stride.

Time is the single most crucial aspect of this game. Like it says in the introduction - you have only seconds to reach your underground base before disaster strikes and, as you struggle violently to keep the car on the track, the timer at the bottom of the screen ticks away at an alarming rate.

The control panel is a space-age art display in the form of a futuristic car dashboard and takes up almost three-quarters of the screen. It shows all the required info relative to the game but there are also a host of other lights and dials which do absolutely nothing and are of ornamental value only. The flash drawing of the V-8 below the control panel is nice to look at but takes precious screen space away from the actual game. Speaking of drawings, a colourful hi-res title screen is incorporated into the Commodore & Amstrad versions of the game but, for reasons unknown, Mastertronic decided to give it a miss on the Atari version.

Scrolling is fast and smooth even by Atari standards, but the game is a bit of a pig to play. Car control is the main problem as the program is over-sensitive to joystick commands. A heavy touch in the wrong direction will send the car spinning out of control. Also, the track is far too narrow and it's easy to stray off and collide terminally with the trackside scenery - oh yes, and you only get one life. No second chances here!

Graphically, the game is a big improvement over their previous Atari effort - Clumsy Colin the Action Biker - but there is a distinct lack of any game sounds apart from the haunting theme music which plays away incessantly. I get the feeling I've heard this tune before, or something remarkably like it, on one of the Synapse games - Dimension X, I think?

So what happens when you eventually reach the underground base? Answers on a postcard please. So far I haven't even managed to negotiate the first U-bend and it seems the inner delights of the LAST V-8 will forever remain a mystery to me.

Despite all this, it's far from the worst Atari game on the market and should appeal to anyone who likes a good challenge. At the asking price of £2.99it must rate as quite a bargain.

One final point. Mastertronic claim the game features voice synthesis, but I never encountered any (it's almost as rare as Ocean's Atari software!). As far as I know, only the Commodore version has speech. Seems like Commodore owners get an even better deal for their £2.99.

SPRONG

Bignose Software
48K cassette/disk
1 Player
Joystick



Author Paul Lay is a regular Page 6 contributor and was responsible for the excellent 'Freeway Ace' in Issue 16. This time he makes the progression into the hard commercial world with an all-machine code arcade type game entitled SPRONG.

In SPRONG you must guide a pogo-jumping character through an incredible 50 screen adventure to claim the elusive 'Golden Pogostick'. You traverse each screen from left to right, leaping across various assorted platforms of all shapes, forms and sizes.

The game opens up with a neat little title screen (which then becomes Screen 1 of the game itself) accompanied by a jazzed-up version of the song 'Danny Boy' - an unusual but nonetheless well-orchestrated musical choice. Like all theme music it becomes annoying after a short while and can be turned off if desired.

SPRONG has a certain cartoon feel to it with every single screen possessing it's own unique background scenery ranging from houses of little towns or villages, wooded countryside, underground caverns and a host of other artistically drawn designs. Obstacles include moving platforms, raging fires, lava flows, lazer beams, acid rain, lightning, helicopters, meteors etc. and critical timing is required to jump your way past them all. You are limited in your jumping ability, but pressing the firebutton gives you extra 'oomph' to leap those long distances.

If, by some minor miracle, you make it through all 50 screens you are then treated to a 'Graphics Spectacular' depicting that illustrious Golden Pogostick.

SPRONG shares certain similarities with English Software's KISSIN' KOUSINS. However, I must stress that these similarities are only superficial and SPRONG boasts vastly superior graphics and playability. Paul has made exceptional use of the Atari's colour palette and could show many Atari programmers a thing or two in this respect. Some of them seem to think the Atari is limited to it's four default colours!

I would be lying if I were to say that SPRONG was easy to play. It rates pretty high in the difficulty league, but it's addictive enough to keep you coming back for more. Plenty of variety too - how many other games have 50 different screens? A splendid first-time effort!

ARCADE CLASSICS

Datasoft/US Gold
48K cassette
£8.95
1 Player
Joystick



Four classic arcade games - POLE POSITION, MR DO, DIG-DUG & PACMAN - all on one tape is the latest offering from US Gold. In actual fact this is a compilation of some old Atari hits from the past which have been reviewed previously in their individual form, so only a brief summary is now required.

POLE POSITION needs no introduction. It's the computer race game which sets the standards for all other race games and, with the exception of Activision's brilliant US ROAD RACE, still leads the field. However, it's inclusion in this set may turn out to be a bit of

a white elephant as it's given away free these days with just about every Atari computer package.

DIG-DUG is identical to the Atari Rom - hardly surprising really seeing as it *is* the Atari Rom downloaded onto cassette. The forerunner of the popular tunnelling games, it's an enjoyable version of the arcade original but not a very authentic conversion. It could have been better, I feel.

The exact opposite applies to MR DO. This is possibly the best conversion of an arcade game that I've seen so far on a home computer. Identical to the original, equally as playable and you don't have to keep banging money into the machine for the privilege!

PACMAN rounds off the quartet. To put it bluntly, this game is a dinosaur and that pesky little dot-gobbler should have been pensioned off years ago regardless of how cute some people think he is! Old Atari hands will already have this game and I doubt if any new owners would want it except as a collector's item (or antique more like!!). As with DIG-DUG, Datasoft have taken the Atari Rom and downloaded it onto cassette. It's one redeeming feature - purely from a collector's point of view - is that Datasoft have added animated sequences between certain rounds of play to bring it in line with the version of Pacman released for the now defunct 5200 games machine. Incidentally, all pro-Pacman letters should be addressed to the editor!

Four great games in their day then, but I have a slight suspicion this compilation may struggle to find a market. POLE POSITION and maybe even MR DO are capable of holding their own amongst the mass of new software releases but, to my mind, ARCADE CLASSICS has been released a year or so too late.

COMING SOON

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TECHNICOLOUR DREAM

Red Rat Software
48k disk/cassette

'The Ultimate 256 Colour Graphic Art Program' shouts at you from the colourful box with demo pictures displayed all over it, and what's more it could be just that depending upon your style of graphics. The program is suitable for any 48k machine XL/XE included and in taking you through both the favourable and unfavourable points, I'm sure you'll be able to decide whether Technicolor Dream is for you.

Technicolor Dream has many excellent features including Help Screen, 256 Colour Palette, 128 colour Filters, Joystick &/or Touch Tablet control, Picture Dump to Screen or Printer, Quick Colour Selection and High Quality Picture Content. The disk version has the main program on side one, coupled with a selection of picture files on both sides. The disk takes approximately one minute to boot up owing to the heavy protection against copying. From the title screen (a Red Rat) it soon slips into the help screen which can be recalled at any time by pressing [ESC]. XL/XE owners can also use the [Help] key to access the screen. The help screen comprises 11 commands, all of which can be used when the picture is displayed.

Selecting a colour is quite good. Pressing the Space Bar displays a 256 palette of colours on the screen and moving the cursor via the Joystick (Port 1) or Touch Tablet (Port 2) to the colour of your choice and pressing [Start] will select your colour. At the bottom of the screen are three boxes, the first box displays your selected colour, the second shows your mixing colour (obtained by using Option & Select, more about this later) and the third box displays the 'Mix Mode' colour i.e. alternate pixels from boxes one and two. Below these boxes are alphanumeric codes (letters & numbers to me & you) signifying the selected colour. These codes are important for later use. Press the Space Bar to return to the drawing screen and start your picture. To access the colours again press the Space Bar and the palette overlays your picture without affecting the drawing screen.

Once you have colours on the drawing screen an easy way to select a previously used colour is to position your cursor over the colour and press [Start]. The manual also suggests 'painting' a selection of colours down the side of the screen to 'dip into'. The 16 main colours are of a solid construction, whilst the brightest are made up from a line of luminescence and a thinner line of black, thus giving a striped effect, however this does look effective no matter how strange it first seems.

Drawing is done with only one brush size although this moves with speed and ease. Alternate changes of colour or luminance can be achieved by typing in an alphanumeric code and using the [Option] key to signify Colour and the [Select] key to choose a Luminance. Using the 'Mix Mode' colour can have pleasing results. As previously stated this gives you a checkerboard pattern.

You can at any time use either the Joystick or Touch Tablet to draw your picture and I hope that other programmers will make use of this feature more often in the future. On completion of your picture, any of 128 different filters can be overlayed to give a delicate tint. A handy feature is the Temporary Storage area in which you can 'store' your picture in its original format whilst you experiment with different colours, shades, and designs. Returning to the original picture can be achieved quite easily. ➚

Saving the picture is fairly easy as is loading. In each case you need to type in the [Device:Filename] but no extender is required. This is mainly because the file is saved twice, once under [Filename:col] and the other as [Filename:lum]. Deleting pictures and formatting disks can also be achieved from within the program. Pictures can also be saved in Compacted or UN-Compacted format. All the pictures can be loaded onto an autorun file (provided) for displaying as a continous show without the need for the main program.

A picture dump to printer is included on the disk although I couldn't get this to work on my Epson RX80F/T. A basic listing is also included in the manual for a printer dump, this does work and takes about 8 minutes to print out a picture on its side down the paper. There is a section entitled 'Advanced Effects' which can be selected by pressing [Control] E, whereupon the screen will disappear and a small black and white miniature is returned in its place. From this section you can change a colour or luminance, add a luminance or create a negative of your picture. Most of the effects are obtained by typing in commands using the aforementioned alphanumeric codes.

With basic listings and explanations in the sixteen page manual, inclusion of pictures into your own programs shouldn't be too much of a problem.

It's a shame to have to come to the unfavourable parts in any program but sometimes there are definite problems with software. In the attempt to be completely innovative, the programmers have forgotten the simple adage of brevity. Many of the commands could easily be achieved by simple keystrokes or use of the Joystick/Stylus, but invariably you have to press a number of keys to obtain the desired result, for example, to clear the screen there are 8 keys to be pressed and to change a colour through the 'Effects' screen can take you up to 21 key presses!

You may have noticed no mention of standard features such as Circle, Square, Line, Point Fill and Zoom etc. These are not included in the program with the exception of Line which takes so long in setting up that you'll achieve it faster manually. The other exception is Fill, which I could only get to fill the whole screen and not selected parts. The other difficulty I encountered was when you choose a colour from the palette which overlays the drawing screen, already full of colour, discerning which colour is which is extremely hard.

Technicolor Dream was originally designed to enhance the quality of artwork for games software and if this is the main reason for buying then you've made a good choice. On the other hand, if you view it as 'The Ultimate 256 Colour Graphic Art Program' then it falls short of the mark. The demo pictures show the obvious quality of the program and if you can put up with its limitations then, priced at £12-95 for disk and £9-95 for cassette, it's a good buy. The package includes a well presented and informative manual all boxed in a rigid plastic case which should survive even the hardest throw the postman can give it.

I hope that future modifications will include some of the more easily accessible commands and in turn lose some of those interminable 21 key presses.

Alan Goldsbro

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HIDDEN DEPTHS

You are part of the crew of one of the few surviving submarines following a devastating Nuclear war. Your original underwater base is in an area now controlled by the enemy. Having found a new base you must try and make as many hazardous trips as possible into enemy held territory to remove supplies from the shelter in the enemy zone (Home 1) to a safer shelter (Home 2) in a non enemy controlled zone. Your submarine has a leaking ballast tank and can only remain stable by pumping air into this tank. As you proceed through each mission the enemy will set mines at random heights and later will try to impede you by raising nets. There is no limit to how many missions you make but it is harder as you progress through each skill level.

PLAYING

The joystick will control all movement of the submarine. Left and right controls the forward and backward movement. Moving the joystick up will force air into the ballast tanks. Too much air will force the submarine to rise too quickly whilst too little will cause it to sink to the ocean floor.

You have 3 lives only and must avoid hitting mines, nets, rocks or the sides of the screen and must not rise to the surface as the air is contaminated.

SCORE

You gain points for staying mobile and get 100 points extra for each successful mission completed. Your air supply is limited so you must strike a balance between continual movement and conservation of air.

TO BEGIN

The opening screen will ask you for a skill level from 1 - 9. Simply press the appropriate key and the screen will go blank for a few seconds before the playfield appears. At the end of each game your score will be displayed and you will be given an opportunity to select a new skill level.

by Philip Dennis

```
EI 1 REM ******************************
FW 2 REM *        HIDDEN DEPTHS       *
XJ 3 REM *       by Philip Dennis     *
EB 4 REM * -------------------------- *
IY 5 REM *  PAGE 6 MAGAZINE - ENGLAND *
EN 6 REM ******************************
NN 8 REM
GS 999 REM  DATA FOR VENETIAN SCROLL
AS 1000 DATA 173,36,2,141,193,6,173,37,2,
   141,194,6
KL 1010 DATA 160,180,162,6,169,7,32,92,22
   8,238
KZ 1020 DATA 192,6,173,192,6,141,10,212,1
   41,26,208
DA 1030 DATA 174,252,2,232,240,238,172,19
   3,6,174,194,6
BG 1040 DATA 169,7,32,92,228,104,96,206,2
   00,2,173,200
MS 1050 DATA 2,141,192,6,76,98,228
OK 1200 REM VENETIAN SCROLL
IM 1205 FOR I=0 TO 63
PU 1210 READ A
EF 1220 POKE 1664+I,A
FC 1230 NEXT I
YO 1235 GOSUB 3000
TR 1290 SETCOLOR 0,0,0:X=USR(1664)
SZ 2499 REM     SET UP
PN 2500 RISE=79:RASE=45:FLA=10:SCO=0:SCA=
   0:COR=0:EXT=0:SHO1=0
BH 2510 HPOSP0=53248:HPOSM0=53252:HPOSP1=
   53249:HPOSM1=53253
IT 2530 FOR I=0 TO 111:READ A
UL 2540 POKE 1536+I,A:NEXT I
QS 2550 GOTO 3500
ZF 2999 REM     TITLE SCREEN
QE 3000 GRAPHICS 18:POKE 16,64:POKE 53774
   ,64
QK 3010 SOU=45:POSITION 3,2:? #6;"  MA
   "
JU 3040 POSITION 3,3:? #6;"DA  GED"
YS 3050 POSITION 7,5:? #6;"nuclear"
KD 3060 POSITION 13,7:? #6;"SUB":FOR H=20
    TO 206 STEP 2
NT 3070 POSITION 1,10:? #6;"program by p
   dennis"
SD 3080 POKE 710,H:SOUND 1,SOU-10,12,3:PO
   KE 711,H+11
XK 3090 SOUND 2,SOU+10,10,3:SOU=SOU+5:SOU
   ND 0,SOU,10,4
QF 3100 FOR ZR=1 TO 10:NEXT ZR:NEXT H
NE 3110 FOR V=1 TO 100:NEXT V
BQ 3120 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
    2,0,0,0
FR 3125 OPEN #1,4,0,"K:"
ZY 3130 POSITION 1,9:? #6;" INPUT SKILL L
   EVEL"
TV 3140 POSITION 1,10:? #6;"       1 TO 9
   "
BJ 3145 RETURN
PI 3498 REM  GOTO DRAW PLAYFIELD and PUT
MZ 3499 REM     P/M ONTO SCREEN
LX 3500 GET #1,K:IF K<49 OR K>57 THEN K=4
   9
CG 3510 SKI=K-48:K=49:DF=1:FD=0.4:COUNT=0
KP 3520 GOSUB 6000:GOSUB 8000
OQ 3530 GOTO 4000
IM 3699 REM  TORPEDO ROUTINE
EK 3700 Z1=0:SHO1=SHO1+1:IF SHO1>4 THEN R
   ETURN
NI 3710 X1=X1+1:Z1=Z1+1:POKE 53249,X1:SOU
   ND 0,200-Z1,2,10
WH 3750 SH1=PEEK(53253):IF SH1<>0 THEN X1
   =X0:POKE HPOSP1,X1:GOTO 3810
RV 3800 GOTO 3710
QT 3810 Z3=Z1+X0:IF Z3>199 THEN 3890
KS 3815 FOR I=2 TO 8:COLOR I:SOUND 0,10*I
   ,0,14
```

```
UO 3820 PLOT Z3-44,Z2+71:DRAWTO Z3-44,Z2+
    72:DRAWTO Z3-43,Z2+69:DRAWTO Z3-43,Z2+
    74
ND 3830 DRAWTO Z3-42,Z2+69:DRAWTO Z3-42,Z
    2+74:DRAWTO Z3-41,Z2+71:DRAWTO Z3-41,Z
    2+72
FT 3840 NEXT I
YY 3850 ? 4-SHO1;"←";
WZ 3890 POKE 53278,0:COLOR 3:RETURN
KG 3999 REM  MAIN LOOP TO MOVE P/M
OC 4000 LV=1:LM=1
YH 4010 S=0:POKE HPOSP1,5
VE 4020 SETCOLOR 4,7,5:POKE 704,10:POKE 7
    05,30
HA 4030 POKE 53278,0:HL=0:HS=0
BM 4040 FOR K=0 TO HL:IF SKI<4 THEN GOTO
    4080
UH 4050 GOTO 7090
HW 4059 REM  MOVE NETS
FS 4060 PLOT 110,45:DRAWTO 110,INT(RASE+2
    )
IY 4070 PLOT 78,56:DRAWTO 78,INT(RASE+10)
QM 4080 S=S+0.05:POKE HPOSM1,10*S+140
IR 4090 IF RISE<17 THEN RISE=17.2
UG 4100 IF RASE<15 THEN RASE=15.2
GS 4109 REM  CHECK FOR COLLISION
FN 4110 L=PEEK(53252):IF L<>0 THEN GOTO 4
    500
OB 4120 IF XM0<100 THEN X1=5:POKE HPOSP1,
    5:SOUND 0,0,0,0:SOUND 1,0,0,0:GOTO 416
    0
BE 4125 POKE 53248,X0:J=PEEK(632)
JY 4129 REM  JOYSTICK CONTROL
DL 4135 IF PEEK(644)=0 THEN GOSUB 3700
OK 4140 IF J=14 THEN SOUND 1,1,0,6:SOUND
    0,0,0,0:XM0=XM0-FD:POKE HPOSM0,XM0:S=S
    -0.1
GO 4145 IF J=10 THEN SOUND 0,123,12,8:SOU
    ND 1,1,0,6:XM0=XM0-FD:POKE HPOSM0,XM0:
    S=S-0.1
ZI 4150 IF J=6 THEN SOUND 0,123,12,8:SOUN
    D 1,1,0,6:XM0=XM0-FD:POKE HPOSM0,XM0:S
    =S-0.1
NI 4160 IF J=15 THEN SOUND 0,0,0,0:SOUND
    1,0,0,0
OG 4170 X1=X0:POKE HPOSP1,X1:POKE 704,FLA
    :POKE 705,30
WF 4180 FLA=FLA+16:IF FLA>240 THEN FLA=10
TF 4190 IF S>0 THEN GOTO 4220
TK 4200 IF S<0 THEN GOTO 4240
SD 4210 GOTO 4260
TE 4219 REM  MOVE P/M UP/DOWN
BY 4220 FOR I=0 TO S:Z2=Z2+0.5:RES=USR(15
    74,P0,P1):Y0=Y0+1:NEXT I
SJ 4230 GOTO 4260
YN 4240 FOR I=S TO 0:Z2=Z2-0.5:RES=USR(15
    36,P0,P1):Y0=Y0-1:NEXT I
IS 4250 REM
GK 4260 NEXT K
VL 4270 HL=5-5*ABS(HS):J=PEEK(632)
DI 4280 IF PEEK(644)=0 THEN GOSUB 3700
QV 4285 IF J=14 THEN SOUND 1,1,0,6:SOUND
    0,0,0,0:GOTO 4330
WC 4290 IF J=15 AND HS>0 THEN HS=HS-0.01:
    SOUND 0,0,0,0:SOUND 1,0,0,0:GOTO 4330
XH 4300 IF J>4 AND J<8 THEN HS=HS+0.35:PO
    KE HPOSM0,XM0:SOUND 0,123,12,8:IF HS>1
     THEN HS=1
DS 4310 IF J>8 AND J<12 THEN HS=HS-0.35:P
    OKE HPOSM0,XM0:SOUND 0,123,12,8
FO 4315 X1=X0:POKE 53259,X1
NW 4320 IF HS<-1 THEN HS=-1
WL 4330 X0=X0+INT(HS)
QQ 4340 GOTO 4040
BO 4499 REM  P/M HIT SOMETHING
DN 4500 POKE 53278,0
TM 4510 POKE HPOSP1,5:SOUND 0,0,0,0:SOUND
    1,0,0,0
NN 4520 IF LV=1 THEN GOTO 4700
FY 4529 REM MOVE OUT OF START POSITION
OF 4530 J=PEEK(632):IF J=14 THEN GOTO 457
    0
ZO 4540 IF J=6 THEN GOTO 4570
ZJ 4550 POKE 16,64:POKE 53774,64
SV 4560 GOTO 4530
IW 4569 REM  MOVE SUB UP FROM START POSI
    TION
WH 4570 FOR I=0 TO 1
TV 4580 RES=USR(1536,P0,P1)
GD 4590 NEXT I
OX 4600 GOTO 4010
HP 4699 REM  P/M IN HOME POSITION
DI 4700 IF X0>61 AND X0<73 AND Y0>170 AND
     S<0.2 THEN POKE 19,0:GOTO 4530
QV 4799 REM  P/M IN TARGET POSITION
HX 4800 IF X0>140 AND X0<171 AND Y0>140 A
    ND S<1 THEN SKI=SKI+1:COR=COR+1:GOTO 5
    200
AT 4810 SC=PEEK(19):COUNT=COUNT+SC:SHO1=0
    :GOTO 5000
XF 4820 FOR J=1 TO 500:NEXT J:SHO1=0:GOTO
     5500
SK 4999 REM  EXPLOSION
BA 5000 POKE 53248,5:POKE HPOSP1,5:POKE H
    POSM0,5:POKE HPOSM1,5
CM 5010 FOR I=0 TO 10
CZ 5020 FOR J=0 TO 10
JE 5030 SETCOLOR 4,I,10
GP 5040 SETCOLOR 2,I,10:SOUND 0,10*I,0,10
    :SOUND 1,5*I,0,10
WP 5050 NEXT J:NEXT I
LV 5060 SHO1=0:EXT=EXT+1
CF 5070 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
     2,0,0,0
EA 5199 REM  SET UP FOR ANOTHER TURN
SO 5200 SHO1=0
BH 5210 POKE 53248,5:POKE HPOSP1,5:POKE H
    POSM0,5:POKE HPOSM1,5
YN 5230 SETCOLOR 2,0,0:SETCOLOR 4,0,0
RY 5240 SC=PEEK(19)
CX 5250 COUNT=COUNT+SC:IF EXT=3 THEN GOTO
     5500
ZQ 5280 GOSUB 6000:GOSUB 8000:GOTO 4010
YY 5499 REM  END SCORE SCREEN
BK 5500 POKE 53248,5:POKE HPOSP1,5:POKE H
    POSM0,5:POKE HPOSM1,5
YY 5510 GRAPHICS 18:SOUND 0,0,0,0:SOUND 1
    ,0,0,0:SOUND 2,0,0,0
XI 5520 SETCOLOR 0,0,0:POKE 16,64:POKE 53
    774,64
DV 5530 POSITION 6,1:? #6;"YOU HAVE"
HH 5540 POSITION 4,3:? #6;"COMPLETED ";CO
    R
WX 5560 COUNT=COUNT+(COR*100)
XZ 5570 IF COR=1 THEN POSITION 6,5:? #6;"
    MISSION":GOTO 5590
PH 5580 POSITION 6,5:? #6;"MISSIONS"
BE 5590 POSITION 6,7:? #6;"SCORE=";COUNT
YY 5600 POSITION 1,9:? #6;"INPUT SKILL LE
    VEL"
LE 5610 POSITION 1,10:? #6;"      1 TO 9
    ":X=USR(1664)
KA 5620 GET #1,K:IF K<49 THEN GOTO 5600
DN 5630 IF K>57 THEN GOTO 5600
ZP 5640 SKI=K-48:SC=0:LM=1:COR=0:EXT=0
QX 5650 GOTO 3500
CS 5660 IF SKI<5 THEN GOTO 205
TS 5999 REM  DRAW PLAYFIELD
GX 6000 GRAPHICS 7:SETCOLOR 2,1,0:SETCOLO
    R 4,7,5:COLOR 2
PB 6005 RESTORE 9050
BF 6010 Z2=0:POKE 559,0:REM TURN OFF S'RN
BR 6020 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
     2,0,0,0
```

```
YW 6040 PLOT 10,73:DRAWTO 30,73:PLOT 107,
     60:DRAWTO 125,60
ZN 6050 COLOR 3
VC 6060 READ QX,QY:IF QX=210 THEN 6150
AY 6065 IF QX=200 THEN 6100
KD 6070 PLOT QX,QY
ZQ 6075 READ QX,QY
JY 6080 IF QX=220 THEN COLOR QY:GOTO 6060
GC 6085 IF QX=210 THEN 6150
AN 6090 IF QX=200 THEN 6100
CF 6095 DRAWTO QX,QY:GOTO 6075
EW 6100 IF QY=210 THEN 6150
YE 6110 READ QX,QY:POSITION QX,QY:READ QX
     ,QY
EQ 6120 POKE 765,QX:XIO 18,#6,0,0,"S:"
SH 6130 GOTO 6060
AY 6150 COLOR 3:IF SKI>1 THEN GOTO 7000
UN 6160 RISE=79:RASE=45
PL 6170 POKE 752,1
XQ 6180 LM=LM+1
CB 6499 REM  DRAW WINDOW SCEEN
ZK 6500 ? "4 TORPEDOS__________________________
     ___________"
WC 6510 ? "AIR SUPPLY0_________________________
     ____FULL"
RO 6520 ? "SPEED  UP ____________________+_______
     ____DOWN"
LM 6530 ? "____________________________________
     ___________↑↑↑→";:POKE 752,2
DB 6540 COLOR 3:POKE 559,34:RETURN
TJ 6999 REM  SKILL LEVEL CHECK ROUTINE
RC 7000 MINE=5:NOMINE=4
UO 7010 NOMINE=NOMINE+(SKI-2):IF NOMINE>6
      THEN NOMINE=6
NF 7020 FOR X=1 TO NOMINE:ZZ=MINE:ZX=(10*
     RND(1))+30:PLOT ZZ,ZX
RK 7030 PLOT ZZ+2,ZX:PLOT ZZ,ZX+2:PLOT ZZ
     +2,ZX+2
CK 7040 DRAWTO ZZ+1,ZX+1:DRAWTO ZZ+1,1
YE 7050 IF SKI=2 THEN MINE=MINE+45
AN 7060 IF SKI>2 AND SKI<6 THEN MINE=MINE
     +30
VR 7070 IF SKI>5 THEN MINE=MINE+23
YK 7080 NEXT X:GOTO 6160
HK 7090 RISE=RISE-0.4:IF SKI>7 THEN RISE=
     RISE-0.2
YU 7100 RASE=RASE-0.09:IF SKI>8 THEN RASE
     =RASE-0.05
QK 7110 PLOT 32,79:DRAWTO 32,INT(RISE)
FQ 7120 IF SKI<5 THEN GOTO 4070
RM 7130 GOTO 4060
YN 7999 REM  SET UP P/M
AM 8000 X0=62:X1=62:Y0=171:Y1=178
XU 8010 YM0=197:YM1=207:XM0=188
XM 8020 POKE 53248,62:POKE HPOSP1,5:POKE
     HPOSM0,188
AS 8030 A=PEEK(106)-24
EQ 8040 POKE 54279,A:Q1=256*A
EK 8050 POKE 53277,3:POKE 559,62
DR 8060 POKE 704,10:POKE 705,30
MN 8070 V=A+3
XB 8080 P0=V+1:P1=V+2
NA 8090 RES=USR(1612,V)
WM 8100 RESTORE (9150)
WS 8109 REM  READ DATA TO SET UP SUB
CE 8110 FOR I=Q1+1024+Y0 TO Q1+1032+Y0
AT 8120 READ A:POKE I,A
FH 8130 NEXT I
QO 8139 REM  READ DATA TO DRAW TORPEDO
OC 8140 FOR I=Q1+1280+Y1 TO Q1+1281+Y1
CU 8150 READ A:POKE I,A:NEXT I
LM 8159 REM READ TO DRAW NEEDLE/MARKERS
LD 8160 FOR I=Q1+768+YM0 TO Q1+789+YM0
DA 8170 READ A:POKE I,A:NEXT I
BG 8180 RETURN
PY 8999 REM  DATA FOR ALL P/M SET UP
```



```
SZ 9000 DATA 104,104,104,133,205,104,104,
     133,207,160,1,169,0,133,204,133,206,17
     7,204,136,145,204,200,200,208,247,160
DR 9010 DATA 1,177,206,136,145,206,200,20
     0,208,247,96,104,104,104,133,205,104,1
     04,133,207,160,254,169
SZ 9020 DATA 0,133,204,133,206,177,204,20
     0,145,204,136,136,208,247,160,254,177,
     206,200,145,206,136,136,208,247,96
EC 9030 DATA 104,104,104,133,205,162,0,16
     0,255,169,0,133,204,169,0,145,204,136,
     208
KP 9040 DATA 249,232,138,24,169,01,101,20
     5,133,205,160,255,224,4,208,234,96
HG 9049 REM  DATA TO DRAW SCEEN
DR 9050 DATA 159,75,147,73,143,68,132,66,
     125,61,107,61,108,50,129,49,135,48,137
     ,42,137,42,135,38,200,0,127,42
SN 9055 DATA 3,3,200,0,110,45,3,3,110,45,
     102,41,200,0,91,44,3,3,91,44,82,42,200
     ,0,78,56,3,3,78,56,64,52,200,0
SD 9060 DATA 52,56,3,3,52,56,200,0,31,74,
     3,3,31,74,10,74,12,65,16,62,21,56,22,4
     6,6,40,1,32,200,0,1,79,3
CT 9065 DATA 3,1,79,1,1,159,1,159,79,220,
     1,120,60,120,62,107,62,107,61,103,61,1
     03,59,93,59,103,60,88,60,88
YF 9070 DATA 61,103,61,88,62,107,62,220,1
     ,20,74,20,78,20,76,7,76,7,74,3,74,3,75
     ,7,75,7,76,3,76,210,210
BC 9149 REM  DATA TO DRAW SUB
CE 9150 DATA 12,12,12,30,255,255,255,30,0
VI 9159 REM  DATA TO DRAW TORPEDO
EE 9160 DATA 14,0
NU 9169 REM DATA TO DRAW WINDOW POINTERS
TP 9170 DATA 0,0,0,3,3,3,3,3,3,3,3,12,12,
     12,12,12,12,12,12,12,0,0
```

□

How to Type in the Listings

and get them right!

The program listings in PAGE 6 are prepared carefully to ensure that they can be typed in as easily as possible. Before typing any listings ensure that you are familiar with the use of the Shift and CONTROL and INVERSE keys as outlined in your computer manual. The listings are prepared to match exactly what you see on screen. Every character that you may see in a listing is included in the chart below for cross reference. By using TYPO 3 you can ensure that you type in the programs EXACTLY as they are printed. Remember a single typing mistake may mean a program will not run.

WHAT ARE THOSE CODES?

Each line of a program begins with a special two letter code. THESE SHOULD NOT BE TYPED IN. They are used by the program TYPO to check that you have typed each line correctly. IF YOU HAVE NOT ALREADY TYPED IN THE TYPO 3 LISTING PLEASE DO SO NOW. The program can be used as you type in each line of a program or to check an already typed program. The code for each line will match but if you have problems check the listing conventions below carefully, you are most probably typing a CONTROL character incorrectly. TYPO 3 cannot check if a line has been missed so if you have problems in running a listing count the lines in the program and ensure none are missing. If the TYPO codes match and the program still does not run, LIST it to cassette or disk using LIST "C:" or LIST "D:filename", switch off the computer, re-boot and then ENTER the program using ENTER "C:" or ENTER "D:filename". Save this version in the normal way.

HOW TO USE TYPO 3

1. Type in the listing carefully for although you can use TYPO 3 to check itself (see 6 below) it may not work if you have made mistakes.

2. SAVE or CSAVE a copy of the program.

3. Each time you want to type in a program listing RUN TYPO 3 *first*. The program will install a machine code routine in memory and then delete itself. Now type in a line as shown in the magazine *excluding the first two letter code* and press RETURN.

4. A two letter code will appear at the top left of your screen. If this code matches the one in the magazine carry on and type the next line. Note, the code will not match if you use abbreviations. If you prefer to use abbreviations LIST the line you have just typed, move the cursor to that line and press RETURN. The code should now match.

5. If the code does not match, use the editing keys to correct the line and press RETURN again. Repeat if necessary until the codes match.

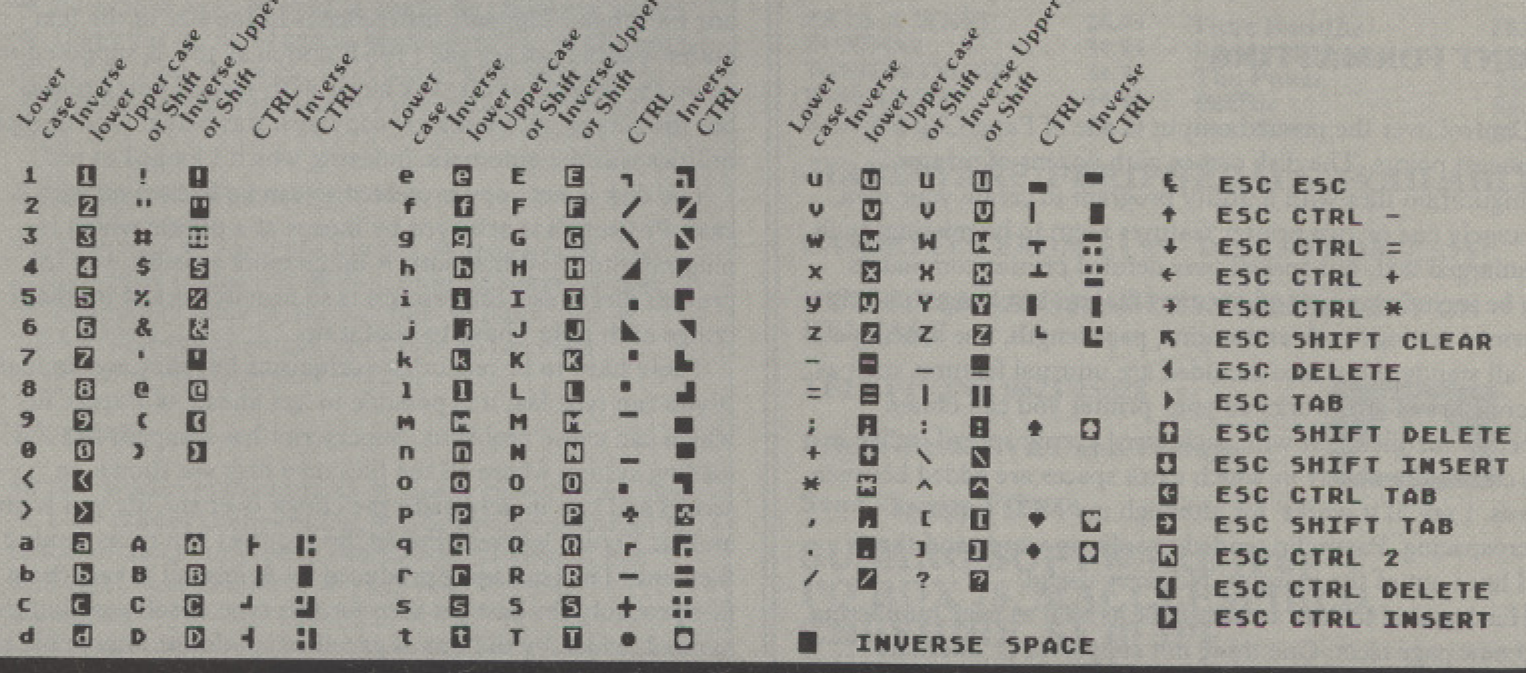
6. To check a line you have already typed LIST the line, place the cursor on that line and press RETURN.

7. When you have finished a listing just SAVE or CSAVE it in the normal way.

You can type in a program without using TYPO 3 and then check it by SAVEing or CSAVEing a copy of the program, running TYPO 3 and then LOADing or CLOADing your program and proceeding as in step 6 above.

Always SAVE or CSAVE a program before running it and always use TYPO before telling us that a program will not run.

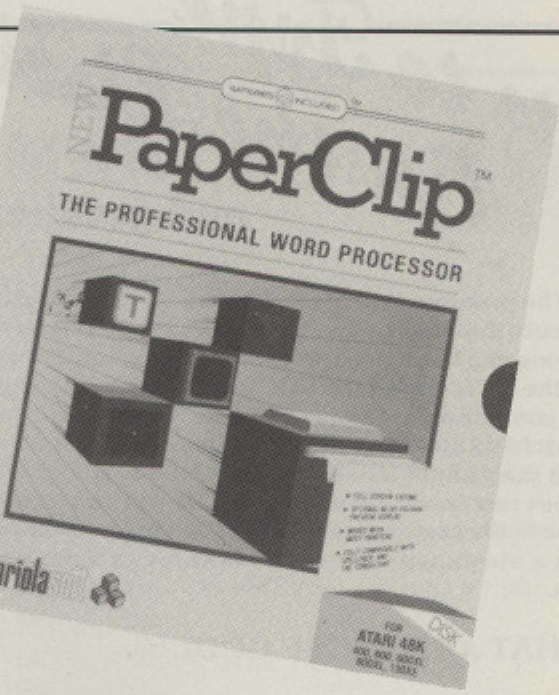
```
EI 1 REM ********************************
AL 2 REM *  TYPO III by Alec Benson     *
         *          June 1985           *
SA 3 REM * A proofreader for ANTIC and *
         *   PAGE 6 based on TYPO II    *
         * published by ANTIC magazine *
EL 4 REM ********************************
SG 100 GRAPHICS 0
WG 110 FOR I=1536 TO 1791:READ A:CK=CK+A:
   POKE I,A:NEXT I
CG 120 IF CK<>30765 THEN ? "Error in DATA
    statements - Check Typing":END
YM 130 A=USR(1536)
VT 140 ? :? "TYPO III is up and running":
   NEW
MA 1000 DATA 104,160,0,185,26,3,201,69
HG 1010 DATA 240,8,200,200,200,192,36,208
QB 1020 DATA 242,96,200,169,79,153,26,3
RK 1030 DATA 200,169,6,153,26,3,162,0
RR 1040 DATA 189,0,228,157,79,6,232,224
TO 1050 DATA 15,208,245,169,93,141,83,6
KC 1060 DATA 169,6,141,84,6,173,4,228
EU 1070 DATA 105,0,141,95,6,173,5,228
BK 1080 DATA 105,0,141,96,6,169,0,162
KK 1090 DATA 3,149,203,202,16,251,96,0
ZR 1100 DATA 0,0,0,0,0,0,0,0
LD 1110 DATA 0,0,0,0,0,0,32,94
JM 1120 DATA 6,8,72,201,155,240,55,230
TV 1130 DATA 203,133,209,138,72,169,0,133
TW 1140 DATA 208,162,8,10,38,208,6,209
MF 1150 DATA 144,7,24,101,203,144,2,230
RL 1160 DATA 208,202,208,239,133,207,24,1
   65
TM 1170 DATA 204,101,207,133,204,165,205,
   101
AW 1180 DATA 208,133,205,165,206,105,0,13
   3
XH 1190 DATA 206,104,170,104,40,96,138,72
WR 1200 DATA 152,72,162,0,134,207,134,208
GF 1210 DATA 160,24,6,204,38,205,38,206
EA 1220 DATA 38,207,38,208,56,165,207,233
TM 1230 DATA 164,170,165,208,233,2,144,4
SK 1240 DATA 134,207,133,208,136,208,227,
   162
CB 1250 DATA 0,165,207,133,204,165,208,6
XN 1260 DATA 204,42,201,26,144,4,233,26
MB 1270 DATA 230,204,202,208,242,133,205,
   169
BC 1280 DATA 128,145,88,200,192,40,208,24
   9
WV 1290 DATA 165,204,105,160,160,3,145,88
QA 1300 DATA 165,205,24,105,161,200,145,8
   8
MQ 1310 DATA 32,69,6,104,168,76,153,6
```



Review

PaperClip

Ariolasoft/Batteries Included



reviewed by Les Ellingham

Ever since Issue 17 when I reviewed Superscript I have been using that program to prepare every issue of PAGE 6. I considered Superscript to be the finest word processor available for the Atari so I was most interested to have the opportunity at last of testing PaperClip, a word processor which has been hailed in the States as the 'definitive' Atari word processor.

Let's start out by saying that PaperClip has everything that Superscript has, well almost, and a lot more besides. From the very start it is evident that this is a fine word processor containing virtually everything you would need for any task from writing a letter home to producing a fully indexed book complete with a table of contents! As with any complex program it will take you some time to learn all of the facilities available but on-screen Help files are available at the push of a button or with a couple of key strokes. If you just want to do something simple to begin with, however, just type!

EDITING

The first thing that strikes your eye is that PaperClip uses a re-defined character set. Each character is slightly larger than the standard Atari characters and is in a sort of 'old English' style. Quite pleasing on the eye and very easy to read. All of the editing commands that you would expect of an advanced word processor are available from deleting characters, words or lines to defining and moving, copying or deleting blocks of text. All fairly standard but PaperClip has many little extras such as character or word toggle. If you make the classic typing mistake of transposing two characters, you need only place the cursor on the second character and, with one keypress, flip the characters. Likewise with any two adjacent words.

SEARCH and REPLACE

Any word or character can be found quickly and changed if required for any other text. Global substitutions are possible, but not just over one document. Multiple documents can be chained together, in fact as many as your disk will hold, and a global search and replace can be performed over every chained, or batched, file on the disk! What's more several global substitutions can be performed at the same time.

PRINT FORMATTING

Control over the printed output is one of PaperClip's strongest points. The disk comes with dozens of printer configuration files with a utility program to create your own. Strangely one or two printer features seem to be missing, such as enlarged text, but special user defined printer commands can be included or a configuration file can be changed to suit. Obvious settings such as margins, page length, line spacing etc. are all standard but also included are unusual features such as Microspacing. If it works on your printer you can obtain superbly justified text with each word evenly spread unlike in the conventional way in which extra spaces are added between words. I say 'if it works' for although my NEC supports microspacing, Paperclip tended to split up words and throw odd lines out of the margins. Not very useful!

Headers and footers are available as well as page numbering and new page eject. One thing not supported is 'alternate paging' where odd and even numbered pages can be treated differently with margins and headings set to the left or right as appropriate. Superscript scores heavily here as it can print odd numbered pages first and allow you to reverse each page and then print the even numbered pages on the other side. One thing PaperClip does have though and which is very easy to implement is double column printing which it achieves in one pass i.e. the two columns are printed at the same time rather than reversing the paper as some word processors do. This feature is easier to use than on any other word processor I have tried and can produce some excellent professional looking results, particulary if the Print Preview option is used first.

MUCH MORE

There is even more to PaperClip such as the ability to include graphics in a document, do mathematical calculations on columns etc., use in 'Typewriter mode', produce automatic tabling of contents, include comment lines and more. It also allows you to work on two documents at once in different windows. And you can do mail merge. And you can define keyboard macros. And...

In fact there is too much to comment on everything so check the feature summary to see just what is available.

CONCLUSIONS

Paperclip comes with two options, one for the 130XE and one for others. The only difference is in the size of the text buffer. I could not try the 130XE option as this is supposed to be on the reverse of the disk along with several new utilities but the reverse of the review copy disk was blank! One of these utilities was the automatic indexing which I longed to try!

The disk is not copy protected so can be backed up with ease. Protection is achieved by means of a dongle which is plugged into a joystick port. A much more sensible way to prevent illegal use. Superscript is so heavily backed up that I cringe each time I have to boot it up.

There have to be one or two criticisms but they are limited. If you can type fast it is possible to 'get ahead' of PaperClip which can cause problems. Superscript has a superb file loading system where all the files on a disk are shown on screen and you merely place the cursor over the file you want and hit Return whereas PaperClip requires you to remember a filename. The packaging produced by Ariolasoft is superb, in fact probably the best yet seen for this type of software but the manual, which by the way is excellent, is almost impossible to

read without using two hands. It should be spiral bound so as to lay flat when you are typing. At present you would need to weight it down or copy parts of it to use it whilst typing.

THE FINAL OPINION

I have to admit it. PaperClip is probably the finest word processor yet produced for the Atari although it does lack a spelling checker which many might consider tips the scales towards Superscript. Nevetheless Superscript may have to bow down! Apart from its features the price, now that it finally has U.K. distribution, makes PaperClip one of your best ever buys if you need a word processor. It costs £44.95. Still quite a lot of money, but worth every penny.

Ariolasoft should feel proud to have a product such as this available at a reasonable cost and anyone needing a powerful word processor should look to PaperClip as the definitive Atari word processor.

PAPERCLIP FEATURES

Not copy protected • Excellent manual • On screen status and command lines • Disk directory display and print • File merge • Two text windows • Text scrolling

OPTIONS

Cursor movement toggle • Screen scroll toggle • Left margin • Line length • Alarm bell toggle • Window size • Auto save of text • Attract mode toggle • Key click toggle • Screen colour change • Printer configuration • Full DOS options

EDITING

Full cursor control • Delete character, word or block • Paste buffer • Undo • Cut & Paste • String search • Text replace • Global substitution • Tags • Caps/lowercase toggle • Insert/Overwrite toggle • Letter swap toggle • Word swap toggle

PRINT FORMATTING

Margins • Page length • Line spacing • Block right • Centering • Mixed formats • Justification • Microspacing • Headers • Footers • Page numbering • Force new page • Bold • Italic • Character pitch • Underline • Hard spaces • Auto indent • Hanging indent • Tabs • Single sheet pause • Multiple copies • Double column printing • Print preview • Print to disk

SPECIAL FUNCTIONS

Mathematics • Table of Contents • Indexing • User defined print commands • Non printing comment lines • Typewriter mode • Include files • Batch files • Global substitution within batch files • Graphics inclusion • Mail merge • Macros

EXTRAS

30 plus printer configurations • Epson character set load • User defined configuration • Atariwriter converter • Graphics dump for Koala, Atari Artist, B/Graph, Fun with Art, Paint and more • Help files • Demo documents

contact

GRAPHICS ENTHUSIAST: enthusiastic user of Graphics utilities, Atari Artist, Fun with Art, MicroPainter etc. would like to exchange picture files on disk, problems, ideas etc. Also want to exchange/part exchange my 800XL for a plotter or dot matrix printer. Keith Berry, 50, Brantley Road, Birmingham, B6 7DR. Tel. 021 328 6853

BOOKS FOR SALE: Your Atari Computer £12, Compute!'s First Book of Atari £6, Basic, 2nd edition, A Self Teaching Guide £6, Mastering Computers £6, Atari 400/800 Basic Reference Manual £6, Atari 400/800 DOS 2 Reference Manual £6. Will sell or exchange. Phone J.W. Harrison on 0942 864732

BADGES OR BAGS: Wanted urgently, badges or bags with the Atari logo. Also I would like to get in touch with any other Atari users in my area. Vincent Campion, Lisduff, Errill, Portlaoise, Co. Laoise, Ireland.

SEIKOSHA PRINTER FOR SALE: Seikosha GP-100 Mk2 printer complete with Blackthorn Centronics interface, both boxed as new. £95 the pair. Will connect to any Atari. David Walmsley, 62, Meadow Park, Galgate, Nr. Lancaster. Tel. 0524 751593.

FRACTAL PROGRAMS: Information, help wanted. Does anyone have any listings such as shown on Microlive in January? Or could anyone convert Spectrum or BBC programs to Atari? Any information welcome. Don Burley, 177, Legsby Avenue, Grimsby, DN32 0LB. Tel. Grimsby 74550

MERSEYSIDE PEN PALS: Pen pals wanted in the Merseyside area to swap hints and tips on games and programming. I own 48k 800 plus 130XE and am shortly buying an ST. Please write to Mike Lynch, 24, Oakdene Road, Anfield, Liverpool, Merseyside, L4 2SR

BOOKS TO SWAP: Offer - Computer Animation Primer - wanted Atari Roots. Offer - Compute!'s M/L for Beginners - wanted Revised Mapping the Atari or Art of Computer Game Design. Also does anyone know where I can obtain the program disks for Atari Graphics and Arcade Design? Paul Marshall, 32, Bluebell Avenue, Moston, Manchester, M10 9PR

ATARI BASIC REFERENCE MANUAL: Perfect condition £6. Also Sound and Graphics Self Teaching Guide in good condition £4. Contact Steve. Wrexham 753238

FIFE USERS GROUP: I am forming an Atari User Group in Fife. I hope that this will encompass both 8-bit and the ST. There is virtually no retail support in Fife so come on Atari users phone me on 0592 714887 and we will try and get that back-up that our computers need. Lou Singer. Tel. 0592 714887

ANALOGS WANTED: I would still like to obtain ANALOG magazine issues 26, 27 & 28. Mark Hutchinson. Phone 0232 621221- evenings.

BOOKS FOR SALE: Compute!'s Machine Language for Beginners and Compute!'s Second Book of Machine Language. Both in excellent condition £8 each. Tel. D. Harwood on 0923 54381

ADVENTURERS OR OTHERS: I would like to contact other Atari owners. I have a 130XE and enjoy a good adventure. I have all of Brian Howarth's adventures and will gladly swap hints with other adventurers. Please write to Tony Longworth, 13, Greenfield Road, Little Sutton, South Wirral, Cheshire, L66 1PE

1029 PRINTER: Any information or graphics programs for the 1029? Does anyone know how to use Printshop on the 1029? Please contact Alan Wheatley, 48, Cameron Crescent, Buckie, Banffshire, Scotland

MIDI INTERFACING: Has anybody seen any Midi interfacing or sampling projects for the 800XL in any publications or has anybody designed their own? Jim Darnill, 559, Herries Road, Sheffield, S5 8TL

FOR SALE: Direct connect modem for Prestel, BBS etc. £80. 1020 printer £40. 410 Recorder £15. Cassette software originals, books, magazines going cheap. Assembler cartridge and Pilot £10 each. Call Ronnie on 01 203 4545 or write. A.C.Pere, 67, Church Road, London, NW4 4DU

PEN PALS WANTED: I would like to make new friends all around the world to write to about my Atari. I have a 520ST and 800XL and disk drive. Please write to Martin Bradwell, 157, Crosby Road, Grimsby, South Humberside, DN33 1LY, England

ITALIAN ATARI USER GROUP: Would like to contact English and foreign people to write about Atari matters and discuss programming and ideas. We own Atari 800XL and 1050 disk drive. Please write to George Boccardi, 56/12 Cavoretto Street, 10133 TURIN, Italy

PRINTSHOP: Is it possible to use the Atari 1029 printer directly with Printshop? If not is there a way to configure the printer to run with the program? Would a printer driver be of use? Any help appreciated. R. Burden, 105, Duchess Street, Shaw, Oldham, OL2 7XR

DARK CRYSTAL: I cannot find Aughra. Can anyone help? Please write to Nico van den Ameele, Schorpioen 40, 4501 HB Oostburg, Holland

ARROW OF DEATH Pt. 2: I am stuck on the part where you are on the stone slab with the grill. I can give help on Mercenary. Darren Scully, 131, Turret Road, Palmerstown, Dublin 20, Ireland

CLASH OF THE KINGS: Can anyone let me know how to get a boot copy of this program from the March ANALOG to work on a cassette. I have checked my typing and it is correct but the boot copy will not load. Steve Asbury, 547, College Road, Birmingham, B44 0AY

INSIDE ATARI BASIC: Does anyone have a copy of this book for sale? Also can anyone help on using Graphics Art Department and Printshop on a 1029. Advice regarding control codes required. A.R.Clarke, 25, Holborn View, Codnor, Derbys, DE5 9RB. Tel. 0773 44525

KIT FOR SALE: Atari 400 48k, 1010 cassette, Indus GT (Brand new), DOS XL with Indus GT Syncromesh, computer housing, holds 400, GT, 1010 all power supplies. BASIC cartridge, manuals. All for only £280. Phone 0268 710893 and ask for Mike

THE LOST KINGDOM BBS: Situated in the Birmingham area. Name - The Lost Kingdom. Baud - 300/300. Time - 24 hours. Sysop - Bastable . Tel - 021 353 5486. Running on 130XE, WS2000 Modem, two 1050 disk drives and 850 Interface.

DISK DRIVE WANTED: 810 or 1050 disk drive wanted in good working order. Any reasonable price paid. Stan Graham, 6, Shefton Fields, Shrewsbury. Tel. 249963

EQUIPMENT FOR SALE: 800XL with XC11 data recorder, 9 months old. £75. Atari 1029 printer as new, £100. Phone George on 0268 743725

PEN PALS WANTED: I would like to make new friends with anyone in the U.K., U.S.A., Europe, Australia, Canada. I have a 130XE, 1050 disk drive, 1020 printer and 410 recorder. Please write to David Morgan, 85, Walter Road, Ammanford, Dyfed, S. Wales, United Kingdom

1064 RAM PACK: 64k expansion for 600XL £45 o.n.o. 600XL with leads but no mains transformer £10. Mike Phillips, 5, Lewis Place, Porthcawl, Mid-Glamorgan, CF36 3EF. Tel. 065671 4280

ARROW OF DEATH Pt. 2: Could anyone tell me how to get past the stone slab and how to open the grill? Also how do you get past the water in the chasm? Could the person who sent me a printout of hints for Pt.1 send me one for Pt. 2. I have lost your phone number! Thank you. Please write to David Rutter, 30, Birchgate, Bucknall, Stoke-on-Trent, ST2 8JT. Tel. 0782 281599 (after 4 p.m.)

BELGIAN PEN PAL: I would like to contact Atari users and groups all over the world. I'm looking for users who want to exchange tips and ideas etc. Please write to Mike De Cock, Primeurstraat 11, 2100 Deurnel ANTWERP, Belgium

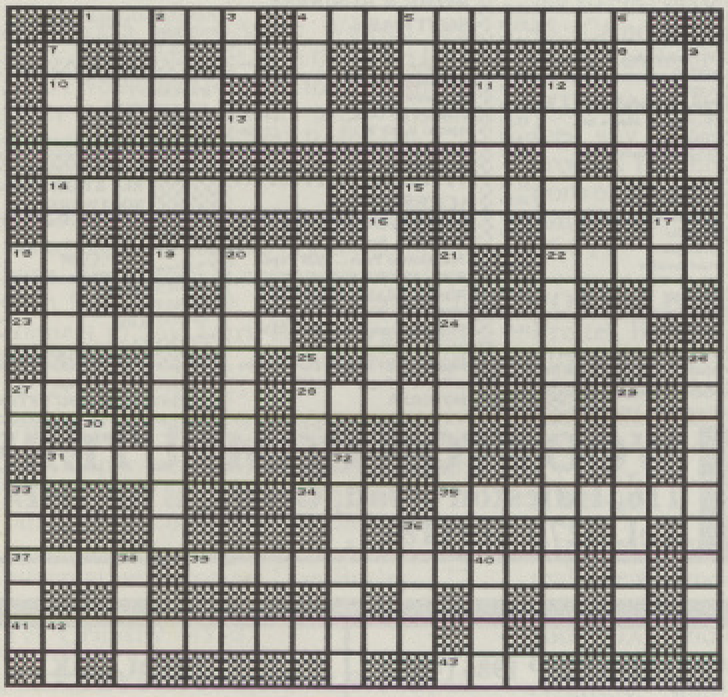
VARIOUS FOR SALE: Having purchased an 800XL I now have the following surplus items. 16k RAM for 400/800. 48k RAM for 400/800. Dust cover for 400. Mains transformer for 400/800 (no 410 outlet). Non-working 400 (ANTIC and POKEY chips faulty - no RAM). Working 400 (intermittent POKEY problems) - no RAM. Any serious offers for the above items would be greatly appreciated. I can be contacted most nights on 0232 621221. Mark Hutchinson

PRIZE CROSSWORD

compiled by Alan Goldsbro

Several readers have requested a crossword so here it is! It also gives us an opportunity to give away a few remaining items of software so if you fancy your chances write down the answers on a sheet of paper, add your name and address and send it to us by 20th July 1986. Please indicate which of the software items you would prefer if you win. There will be 12 lucky winners in all and the winning entries will be drawn on 21st July 1986 from all correct entries received by that date.

The prizes: Missile Command, Qix, Paint (disk), Galaxian, Centipede, Music Composer, Defender, Magic Window, Red Moon, The Worm in Paradise.



A hint: One clue gives a clue to all the other clues!

ACROSS CLUES

1 Oz provides these (5)
4 Just right for beginners (5,5)
8 Cult following? (3)
10 Incorrect (5)
13 A fast one by Ata (12)
14 They're still alive and kicking (5,3)
15 Exclamation when seeing 10 across (6)
18 Home of Atari? (3)
19 An opportunity for Les (9)
22 The second part to this is crazy (5)
23 Ace is one, six is two (8)
24 Our biggest distributor? (6)
27 To be the best (2)
28 Uno numero (5)
31 Christopher Robin knows this one (4)
34 Want a reply? (3)
35 The second word will get you there fast (8)
37 PAGE 6 is always this (4)
39 Get down to it! (11)
41 Take this out now!! (12)
43 There are five pals waiting for you on 66 (3)

DOWN CLUES

2 From 33 down to here (3)
3 520/1040, need I say more? (2)
4 Goto Nick or Frances (4)
5 At last (4)
6 Keep 'em coming, Jim (5)
7 Did you take part? (7,4)
9 Move to 41 (4)
11 This one's an art (5)
12 Do you believe in magic? (6,9,2)
16 This company's on-line (6)
17 Eight or sixteen (3)
19 Publisher (9)
20 One word for adventure (7)
21 Plenty for all levels (8)
25 Paul is horizontal (3)
26 Our saviour? (5,4)
27 Next one up from 27 across (2)
29 All the answers are in the last one (8)
30 In and out (2)
32 The number one magazine (4,3)
33 No need for batteries here (5)
36 Small one from the ST news section (4)
38 75% of the readers use one (4)
40 Media storage (4)
42 Home grown (2)

The crossword was compiled on an Atari with the program Crossword Magic. This is the only crossword program we know of for the Atari but it has always been difficult to obtain. Now it is virtually impossible! The copy used for this crossword was loaned by Games and Software Club of Sunderland.

Could YOU write an article?
Can YOU write good programs?

MONEY

If so, we would like to hear from you so that PAGE 6 can continue to provide the best and most interesting programs and articles for Atari users everywhere.

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Program submissions *must* be on disk (preferably) or tape. Wherever possible, articles should be text files on disk (that's what word processors are for!) backed up with hard copy. If you can't manage that, get it to us in any way you can.

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